Torngat Metals

AECOM

Strange Lake Rare Earth Mining Project

Detailed Project Description (DPD)

Submitted to:

Impact Assessment Agency of Canada (IAAC, Federal Government)

60697132

May 2024

Delivering a better world

Strange Lake Rare Earth Mining Project

Detailed Project Description (DPD)

Submitted to

Impact Assessment Agency of Canada (IAAC, Federal Government)

60697132

Mai 2024

© AECOM All rights reserved

Terms and Limitations

The attached report (the "Report") has been prepared by AECOM Consultants Inc. ("AECOM" or "Consultant") for the benefit of Torngat Metals Ltd. ("Torngat" or "Client") pursuant to the agreement between the Consultant and the Client, including detailed scope of the services (the "Contract").

The information, data, recommendations, and conclusions contained in the Report (collectively, the “Information”):

- are subject to the scope of services, schedule and other constraints and limitations contained in the Contract as well as the terms and limitations set out in the Report (the “Limits”).
- represent the Consultant's professional judgment considering the Limits and industry standards for the preparation of similar reports.
- may be based on information provided to the Consultant that has not been independently verified.
- have not been updated since the date of issuance of the Report and their accuracy is limited to the period and the circumstances in which they were collected, processed, produced, or issued.
- should be read as a whole and therefore no section of the Report should be read out of context.
- were prepared for the specific purposes described in the Report and the Contract.
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and do not vary geographically or over time

The Consultant is entitled to rely on the information provided to it and to assume its accuracy and completeness and has no obligation to update this information. The Consultant accepts no responsibility for events or circumstances which may have arisen since the date the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variations in such conditions, whether geographically or in time.

Without in any way limiting the generality of the above, any estimate or opinion provided by the Consultant regarding the cost and schedule of construction work, or any other professional activity described in the Contract represents the professional judgment of the Consultant considering his experience and the knowledge and information available to him at the time of the preparation of the Report. Having no control over the market, economic conditions, the price of labour, materials and construction equipment or tendering procedures, the Consultant, its director, senior officers and employees are not in any position to make any representations or warranties of any kind whatsoever, express or implied, as to the accuracy of such estimates and opinions or as to the possible discrepancy between them and actual construction costs and schedules or any other professional activity described in the Contract, and accept no responsibility for any damage or loss arising out of or in any way connected therewith. Anyone relying on such estimates or opinions does so at their own risk.

Unless (1) the Consultant and the Client agree otherwise in writing; (2) whether required by law or regulation; or (3) used by a government agency reviewing an application for permit or approval, the Client alone shall be entitled to rely on or use the Report and Information.

The Consultant neither accepts nor assumes any responsibility whatsoever towards any party, other than the Client, who may have access to the Report or the Information and use it, rely on it, or make decisions resulting from it, unless the latter has obtained the Consultant's prior written authorization with respect to such use (“Non-conforming Use”). Any damage, injury or loss arising from improper Use of the Report or Information shall be at the sole risk of the party making such Use.

These Reservations and Limitations form an integral part of the Report, and any use of the Report is subject to these Reservations and Limitations.

Signatures

<original signed by>

Report prepared by: May 30th, 2024

Valérie Tremblay, Biologist, M. Sc.
Project co-director

<original signed by>

May 30th, 2024

Sonia Labrecque, Biologist, M. Sc.
Project co-director

<original signed by>

Report verified by: May 30th, 2024

Bernard Desjardins
Project Director

Production Team

TORNGAT METALS LTD

625 President-Kennedy Ave., suite 605
Montreal, Quebec H3A 1K2

Dirk Naumann	Chief Executive Officer & President
Christine Burow	Chief Marketing Officer
Alain Wilson	Chief Financial Officer
Sylvie St-Jean	Vice-President Environment
Samantha Doig	Vice-President Human Resources
Eric Luneau	Vice-President Community Engagements and Partnerships
Emmanuelle Bécaert	Engineer, Senior Environment Manager

AECOM CONSULTANTS INC.

85 Sainte-Catherine W,
Montreal, Quebec H2X 3P4

Bernard Desjardins	Project director, reviewer and quality control
Sonia Labrecque	Project co-director, Senior terrestrial biologist, writing and revision
Valérie Tremblay	Project co-director, senior Fisheries Biologist, Aquatic environment, writing and revision
Martin Côté	Anthropologist, stakeholder engagement
Patrick Hébert	Anthropologist, social environment
Jean-François Morin	Engineer - air quality, GHG and noise (physical environment)
Lisa Arsenault	Senior Indigenous engagement & environmental geography specialist
Emma Cecchi	Geochemist, mine reclamation and mining recovery specialist
Max Émile Kessler-Nadeau	Scientist, hydrology and geomorphology, physical environment and climate change
Charles Gauthier	Ph.D., Ecotoxicologist, human health and ecological risk assessment (HHERA)
Jacques Langlois	Geomorphologist and water and soil specialist, physical environment
Laurence Goesel	Geographer-planner, human health risk assessment
Shadnoush Pashaei	GHG Specialist
Sebastien Boudreau	GIS, cartography and geomatics specialist
Chloé Drapeau	Report editing

Reference to cite

AECOM. 2024. *Strange Lake B-Zone Rare Earth Mining Project. Detailed Project Description (DPD) and Registration Document.* Submitted to: Impact Assessment Agency of Canada (IAAC, Federal Government), Newfoundland and Labrador Government (NL), Nunatsiavut Government (NG). 364 pages and appendices.

List of Acronyms and Abbreviations

ACOA: Atlantic Canada Opportunities Agency
ATV: All-terrain vehicle
BAT: Best Available Technology
BFS: Bankable feasibility study
BGGP: Bureau de gestion des grands projets
BOD: Biological oxygen demand
CCME: Canadian Council of Ministers of the Environment
CEAA: Canadian Environmental Assessment Agency
CEAEQ: Centre d'Expertise en Analyse Environnementale du Québec
CH4: Methane
CISSSCN: Centre intégré de santé et de services sociaux de la Côte-Nord
CLSC: Centre local de services communautaires
CNA : College of North Atlantic
CNSC: Canadian Nuclear Safety Commission
CO_2: Carbon dioxide
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
CRGBA Culturally relevant gender-based analysis
dBA: Ambient noise level
DFO: Department of Fisheries and Oceans
Dy: Dysprosium
EBSAs: Ecologically and Biologically Significant Areas
ECCC: Environment and Climate Change Canada
EDO: Environmental Discharge Objectives
EIS: Environmental impact statement
EPA: Environment Protection Act
EPR: Environmental preview report
EQA Environmental Quality Act
ESG: Environmental, social and governance
ESIA: Environmental and Social Impact Assessment
ESIS: Environmental and Social Impacts Study
EV: Electric Vehicle
FAFH Fish and Fish Habitat
Fe Iron
FIBC: Flexible Intermediate Bulk Containers

GBA Plus :	Gender-based Analysis Plus
GHG:	Greenhouse gas emissions
GSC:	Geological Survey of Canada
HFC:	Hydrofluorocarbon
HHERA:	Human Health and Environmental Risk Assessment
IAA	Impact Assessment Act
IAAC:	Impact Assessment Agency of Canada
IBA:	Impact and Benefit Agreement
IBA:	Important Bird Area
IDLP:	Innu Development Limited Partnership
IDP:	Initial Project Description
IESG :	Indigenous, environmental, social and governance
INSPQ:	Institut national de santé publique du Québec
IOCC:	Iron Ore Company of Canada
IPCC:	Intergovernmental Panel on Climate Change
IPS:	Indigenous Peoples Survey
ISAQ	Inventory of Archaeological Sites in Quebec
JBNQA:	James Bay and Northern Quebec Agreement
JBRHSSC	James Bay Regional Health and Social Services Centre
KEAC:	Kativik Environmental Advisory Committee
KEQC:	Kativik Environmental Quality Commission
KRG:	Kativik Regional Government
LIL:	Labrador Inuit Lands
LILCA:	Labrador Inuit Lands Claims Agreement
LISA:	Labrador Inuit Settlement Area
LOD:	Limit of detection
LOM:	Life of Mine
LQE:	Loi sur la qualité de l'environnement au Québec
LRC:	Limited radius count
MCC:	Ministère de la Culture et des Communications du Québec
MDDEFP:	Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (2012-2014)
MDDELCC:	Ministère du Développement durable, de l'Environnement et la Lutte contre les Changements climatiques (2014-2018)
MDDEP:	Ministère du Développement durable, de l'Environnement et des Parcs (2005-2012)
MELCC:	Ministère de l'Environnement, la Lutte contre les changements climatiques (2018-2022)
MELCCFP	Ministère de l'Environnement, de la Lutte aux Changements climatiques, de la Faune et des Parcs (2022-…)

MERN: Ministère de l'Énergie et des Ressources naturelles (now MRNF)

MMDMER Metal Mining and Diamond Mining Effluent Regulations

MOU: Memorandum of understanding

MPMO: Major Projects Management Office

MRC: Regional County Municipality

MRNF: Ministère des Ressources naturelles et des Forêts (formerly MERN)

MSSS : Ministry of Health and Social Services

N_2O: Nitrogen dioxide

NAPS: National Air Pollution Surveillance

Nd: Neodymium

NdFeB: Alloy of neodymium, iron and boron

NEQA: Northeastern Quebec Agreement

NG: Nunatsiavut Government

NL: Newfoundland and Labrador Government

NMEF: Nunavik Mining Exploration Fund

NO_2: Nitrogen dioxide

NORM: Naturally Occurring Radioactive Materials

NRCan: Natural Resources Canada

NTS: National Cartographic Reference System

OEL: Occasional effect level

PEA: Preliminary Economic Assessments

PFC: Perfluorocarbon

PFS: Pre-Feasibility Study

Pr: Praseodymium

QMEA: Quebec Mineral Exploration Association

RDL: Reported detection limits

REE: Rare Earth Elements

RLS: Réseau local de services

RRSSN: Régie régionale de la santé et des services sociaux Nunavik

SARA: Species at risk act

Scope 1: Direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization.

Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat, cooling or steam.

SEA: Strategic Environmental Assessment

SECP: Southeast Churchill Province

SF_6: Sulfur hexafluoride

SLAC: Strange Lake Alkaline Complex

SLBZ:	Strange Lake B-Zone
SM:	Suspended matter
SO_2:	Sulfur dioxide
SPA	Saguenay Port Authority
SS	Suspended solids
t	Tonne
t/d	Tons per day
Tb:	Terbium
TEK:	Traditional Ecological Knowledge
TEL:	Threshold effect level
TPM:	Total Particulate Matter
TSP:	Total Suspended Particles
TSS:	Total suspended solids
UDI:	Undetermined distance index
US:	United States
USDOE:	U.S. Department of Energy
VBA:	Voisey Bay Area
VEC:	Valuable Ecosystem Component
VOC:	Volatile Organic Compound
WC:	Water crossing

Table of Contents

Production Team iii
List of Acronyms and Abbreviations v
Cover Letter (Separate Doc) xxiii
Introduction 1
PART A – GENERAL INFORMATION 3
1 Project Name 3
2 Identification of Proponent and Representative 3
2.1 Proponent Identification 3
2.2 Representative Identification 4
PART B – PLANNING PHASE RESULTS 5
3 Summary of the Results of Engagement Activities with any Jurisdiction or Other Party 5
3.1 Information and Consultation Activities Carried Out 5
3.1.1 Results of Consultation Activities Carried out for the Northern Components of the Project (mine, road to the eastern coast of Labrador) 6
3.1.2 Results of Consultation Activities Carried out for the Separation Plant 7
3.2 Planned Information and Consultation Activities during the Conduct of the Environmental and Social Impact Study 9
3.3 Answers to Summary of Issues 12
4 Summary of the Results of Engagement Activities with Indigenous Groups 19
4.1 Information and Consultation Activities Carried Out 19
4.1.1 List of Consultation Activities Carried Out for the Northern Components of the Project 19
4.1.2 List of Consultation Activities with Indigenous Groups Carried out in Sept-Îles Area 25
4.2 Planned Information and Consultation Activities with Indigenous Groups During the Conduct of the Environmental and Social Impact Study 26
4.3 Answers to Summary of Issues 28
5 Previous Studies and Programs 29
5.1 Historical Studies Between 1967 and 2019 29
5.2 Environmental and Baseline Studies Completed by AECOM 30
6 Applicable Strategic Assessments 31
6.1 Strategic Assessment Under the IAA 31
6.2 Strategic Environmental Assessment 31
PART C – PROJECT INFORMATION 33
7 Project Rationale and Purpose 33
7.1 Rare Earth Elements Market 36

7.2 The Role of the Strange Lake Rare Earth Mining Project in the Permanent Magnet Supply Chain 39
7.2.1 Project Economics 39
8 Applicable Provisions 41
8.1 Physical Activities 41
9 Project Description 45
9.1 Brief Description of the Project 45
9.2 Project Components at the Mine Site 45
9.2.1 Mine Pit, Mining Plan and Geochemical Characterization Program 46
9.2.2 Explosives 63
9.2.3 Primary Crusher 63
9.2.4 Concentration Plant 63
9.2.5 Resource Pile 64
9.2.6 Waste Rock and Overburden Piles and Soils 64
9.2.7 Mine Residue Stockpile Area 64
9.2.8 Access/Haul Roads 65
9.2.9 Aerodrome with a 1,500 m Runway 65
9.2.10 Other Buildings 66
9.2.11 Water Supply 66
9.2.12 Domestic Wastewater Treatment 67
9.2.13 Process Wastewater Treatment 67
9.2.14 Power Supply 68
9.2.15 Fuel Storage and Supply 68
9.2.16 Stormwater Management (outside activity areas) 68
9.2.17 Waste and Contaminated Soil Management 69
9.2.18 Emergency Response 69
9.2.19 Construction 69
9.2.19.1 Shipping During Construction 69
9.2.19.2 Access Road and Airstrip 69
9.2.19.3 Camp, Mine, and Facilities 70
9.2.19.4 Explosives 70
9.2.19.5 Stockpile Areas, Borrow Pit 70
9.2.20 Operation and Maintenance 71
9.2.20.1 Mining Operations 71
9.2.20.2 Explosives 71
9.2.20.3 Mine Dewatering 71
9.2.20.4 Dry Comminution (primary crushing) 71
9.2.20.5 Concentration Plant 71
9.2.20.6 Concentrate Packing 71

9.2.20.7 Mine Residue Management 72
9.2.20.8 Emergency Response 72
9.2.20.9 Discharges into the Environment 72
9.2.21 Closure and Restoration 72
9.3 Single Lane Access Road (seasonal and private) Between the Mine and the Eastern Coast of Labrador 74
9.3.1 Access Road Options 74
9.3.2 Construction 75
9.3.3 Operation and Maintenance 76
9.3.4 Closure and restoration 77
9.4 Port Facilities, Container Storage and Handling Facilities and Transportation of the Concentrate to Sept-Îles 77
9.4.1 Port Facilities and Container Storage and Handling Facilities on Eastern Labrador Coast 78
9.4.2 Transportation by Ships 79
9.5 Rare Earth Separation Plant (Sept-Îles) 80
9.5.1 Receipt of Concentrate and Other Raw Materials at Port and Transport to Plant 80
9.5.2 Separation Plant 81
9.5.2.1 Separation Plant Water Supply 81
9.5.3 Process Residue Stockpile Area 81
9.5.3.1 Long-Term Management of Process Residue 83
9.6 Possible Activities Under the Responsibility of Third Parties 83
9.6.1 Renewable Energy Production at Mine Site 83
9.6.2 Transportation by Hybrid Airships 83
9.7 Health, Safety and Environmental Management Policy 84
9.7.1 Site-Specific Training Requirements 84
9.7.2 Emergency Spill Response 84
9.7.3 Incident Response Protocols 84
9.7.4 Evacuation Procedures 84
9.7.5 Risk Management Practices 84
9.7.6 Safety Commitments Towards Employees and Community Members 85
9.7.7 Regulatory Compliance 85
9.8 Employment and Workforce 85
9.8.1 Construction 85
9.8.2 Operations 86
9.8.3 Equity, Diversity and Inclusion 86
10 Production Process and Capacity 93
10.1 Life of the Mine and Mining Operations 93
10.2 Rare Earth Concentration Plant & Process (mine site) 93
10.3 Rare Earth Separation Plant in Sept-Îles 94

10.3.1 Acid Baking (sulfation) and Calcination 95
10.3.2 Water Leaching and Rare Earth Separation (hydrometallurgical process) 96
10.4 Materials Handling 98
10.5 Radionuclides 100
11 Project Schedule 103
12 Potential Alternatives 105
12.1 Alternatives for Carrying Out the Project 105
12.1.1 Size of the Pit and Mining Mode 106
12.1.2 Location of the Concentration Plant and Related Facilities on the Mine Site (industrial area) 106
12.1.3 Sorting and Concentration Processes (mine site) 106
12.1.4 Management Method and Location of the Mine Residue Stockpile (mine site) 106
12.1.5 Location of Final Discharge Points for Treated Water (mine water, sanitary wastewater) 107
12.1.6 Water Withdrawal Sources (process water, drinking water) 108
12.1.7 Aerodrome with 1,500 m Runway (mine site) 108
12.1.8 Renewable Energy Production (mine site) 109
12.1.9 Single Lane Access Road Corridor Alignment and Port Facilities Options 109
12.1.10 Mode of Transportation of the Concentrate to the Rare Earth Separation Plant 110
12.1.11 Location of the Rare Earth Separation Plant 110
12.1.12 Management Method and Location of the Separation Plant Process Residue Stockpile 113
12.1.13 Separation Plant - Process Water Withdrawal Sources 113
12.2 Project Alternatives 113
PART D – LOCATION INFORMATION AND CONTEXT 115
13 Project Location 115
13.1 Geographical Coordinates 115
13.2 Site Maps 116
13.2.1 Study Areas 116
13.3 Official Land Description 117
13.3.1 Mine, Concentration Plant, Aerodome and Part of the Access Road Located in Quebec 117
13.3.2 Part of the Access Road Located in Newfoundland and Labrador, Container Handling and Storage Area and Port Facilities 117
13.3.3 Separation Plant 118
13.4 Proximity to Nearest Local Communities 129
13.5 Proximity to Indigenous Communities 129
13.6 Proximity to Federal Lands 132
14 Biophysical Environment Description 133
14.1 Physical environment 134
14.1.1 Weather and Climate 134

14.1.1.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 134
14.1.1.2 Separation Plant (Sept-Îles project component)..... 139
14.1.2 Ambient Air Quality..... 139
14.1.2.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 139
14.1.2.2 Separation Plant (Sept-Îles project component)..... 141
14.1.3 Ambient Noise Level..... 142
14.1.3.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 142
14.1.3.2 Separation Plant (Sept-Îles project component)..... 143
14.1.4 Geology, Seismic Events and Hazards..... 144
14.1.4.1 Geology..... 144
14.1.4.2 Seismic Events..... 149
14.1.4.3 Seismic Hazards..... 151
14.1.5 Surface geology, geomorphology, and permafrost..... 153
14.1.5.1 Surficial Geology and Geomorphology..... 153
14.1.5.2 Permafrost..... 154
14.1.5.3 Fluvial Geomorphology and Hydrology..... 155
14.1.6 Hydrogeology..... 156
14.1.6.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 156
14.1.6.2 Separation Plant (Sept-Îles project component)..... 162
14.1.7 Hydrology and Water Management..... 162
14.1.7.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 162
14.1.7.2 Separation Plant (Sept-Îles project component)..... 167
14.1.8 Limnology (freshwaters)..... 168
14.1.8.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 168
14.1.8.2 Separation Plant (Sept-Îles project component)..... 168
14.1.9 Surface Water Quality..... 168
14.1.9.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 168
14.1.9.2 Separation Plant (Sept-Îles project component)..... 173
14.1.10 Soil Quality..... 173
14.1.10.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 173
14.1.10.2 Separation Plant (Sept-Îles project component)..... 174
14.1.11 Sediment Quality..... 174
14.1.11.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)..... 174
14.1.11.2 Separation Plant (Sept-Îles project component)..... 175

14.2 Biological Environment 175
14.2.1 Vegetation and Wetlands 175
14.2.1.1 Strange Lake Mine Site, Container Storage and Handling Facilities (northern project component) 175
14.2.1.2 Road Corridor, Container Storage and Handling Facilities (northern project components) 179
14.2.1.3 Separation Plant (Sept-Îles project component) 184
14.2.2 Fish and Fish Habitat (FAFH) 187
14.2.2.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components) 187
14.2.2.2 Separation Plant (Sept-Îles project component) 192
14.2.3 Amphibians and Reptiles 193
14.2.3.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components) 193
14.2.3.2 Separation Plant (Sept-Îles project component) 194
14.2.4 Avian Fauna 194
14.2.4.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components) 194
14.2.4.2 Separation PLant (Sept-Îles project component) 200
14.2.5 Mammals 202
14.2.5.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components) 202
14.2.5.2 Separation Plant (Sept-Îles project component) 207
14.2.6 Terrestrial Species at Risk 207
14.2.6.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components) 207
14.2.6.2 Separation Plant (Sept-Îles project component) 209
14.2.7 Aquatic Species at Risk 209
14.2.7.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components) 209
14.2.7.2 Separation Plant (Sept-Îles project component) 209
14.3 Marine Environment 210
14.3.1 Maritime Transportation from the Labrador Coast to Sept-Îles (shipping route) 210
14.3.1.1 Designated Areas/Zones 213
14.3.1.1.1 The Labrador Inuit Settlement Area (LISA) 213
14.3.1.1.2 Ecologically and Biologically Significant Areas (EBSAs) 213
14.3.1.2 Aquatic Species at Risk and Critical Habitats 214
14.3.2 Vale's Port, Anaktalak Bay, Labrador Coast (access road Option A) 215
14.3.2.1 Marine Baseline Program 2012 215
14.3.3 Voisey's Bay, Labrador Coast (access road Option C1 and C2) 219
14.3.3.2 Studies to Be Carried Out – 2024 Marine Baseline Workplan Next to the Port Facilities 220
14.3.4 The Bay of Sept-Îles 223
14.3.4.1 Biophysical Description 223

15 Socio-Economic and Human Health Description 227

15.1 Land Use and Indigenous Ecological Knowledge 227

15.2 Socio-Economic Conditions, Local Capacity Analysis, and Workforce Analysis 229

15.2.1 Non-Indigenous and Indigenous Communities in Quebec 230

15.2.1.1 Sept-Îles 230

15.2.1.2 Fermont 231

15.2.1.3 Schefferville 231

15.2.1.4 Kuujjuaq 231

15.2.1.5 Kangiqsualujjuaq 232

15.2.1.6 Kawawachikamach 232

15.2.1.7 Matimekush – Lac John 233

15.2.1.8 Uashat mak Mani-utenam 233

15.2.2 Non-Indigenous and Indigenous Communities in Labrador 234

15.2.2.1 Happy Valley-Goose Bay 234

15.2.2.2 North West River 234

15.2.2.3 Labrador City 235

15.2.2.4 Wabush 235

15.2.2.5 Nain 236

15.2.2.6 Hopedale 236

15.2.2.7 Makkovik 236

15.2.2.8 Postville 237

15.2.2.9 Rigolet 237

15.2.2.10 Sheshatshiu 238

15.2.2.11 Natuashish 238

15.3 Human Health, Quality of Life and Psychosocial Impacts 238

15.3.1 Quebec 240

15.3.1.1 Nunavik Inuit 240

15.3.1.2 Naskapi Nation of Kawawachikamach 243

15.3.1.3 Quebec Innu (Matimekush - Lac John and Uashat mak Mani-Utenam communities) 244

15.3.1.4 Non-Indigenous Communities: Sept-Îles, Fermont, and Schefferville 244

15.3.1.5 Health Data on Naskapi, Innu, and Non-Indigenous Communities in Quebec Affected by the Project 244

15.3.2 Labrador 247

15.3.2.1 Nunatsiavut Inuit (communities of Nain, Hopedale and Makkovik) 247

15.3.2.2 Labrador Innu (Sheshatshiu and Natuashish communities) 249

15.3.2.3 Non-Indigenous Communities: Happy Valley-Goose Bay and Northwest River 250

15.4 Archaeology 251

15.4.1 Mine Site and Surroundings 251

15.4.2 Road Corridor, Container Handling and Storage Facilities, Port Facilities 252

15.4.3 Separation Plant Site (Sept-Îles) 252

15.5 Landscape 253
15.6 Areas of Interest 253
PART E – FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS AND MUNICIPAL INVOLVEMENT AND EFFECTS 255
16 Project Funding 255
17 Federal Lands 255
18 Implication of Jurisdictions in the Project's Assessment 255
18.1 Government of Canada (Federal) 255
18.2 Nunatsiavut Government 256
18.3 Québec Government 257
18.3.1 Mining Project (north of the 55th parallel) 257
18.3.2 Separation Plant (Sept-Îles) 258
18.4 Government of Newfoundland and Labrador 259
PART F – MAIN ISSUES AND POTENTIAL EFFECTS OF THE PROJECT 261
19 Potential Changes to the Environment 261
19.1 Description of the Main Issues 261
19.1.1 Issue - Protection of Human Health and Quality of Life in Communities 261
19.1.2 Issue - Protection of Biodiversity, Both Flora and Fauna, Including Species at Risk and Species of Importance to Indigenous Communities 262
19.1.3 Issue - Preservation of the Quality and Ecological Functions of Receiving Environments, Notably Wetlands, Bodies of Water and Soils, Including Permafrost 262
19.1.4 Issue - Maintenance and Conciliation of Land Uses in the North 263
19.1.5 Issue - Climate Change and the Balance of GHG Emissions 263
19.1.6 Issue - Social Acceptability 263
19.1.7 Taking into Account Environmental and Social Issues in Project Design 263
19.2 Description of the Main Anticipated Impacts of the Project on the Receiving Environment, Planned Mitigation or Restoration Measures 264
19.2.1 Development and Construction Phases 271
19.2.1.1 Activities Likely to Impact Receiving Environment 271
19.2.1.2 Physical Environment 272
19.2.1.3 Biological Environment 279
19.2.1.4 Social Environment 283
19.2.2 Operational Phase (30-year operation) 288
19.2.2.1 Activities Likely to Impact Receiving Environment 288
19.2.2.2 Physical Environment 289
19.2.2.3 Biological Environment 296
19.2.2.4 Marine Environment 300
19.2.2.5 Social Environment 302
19.2.3 Closure and Restoration Phase 307

19.2.3.1 Activities Likely to Impact Receiving Environment 307
19.2.3.2 Physical, Biological and Social Environments..... 308
19.2.4 Environmental Monitoring and Follow-up Programs 308
20 Potential Changes to the Environment (federal lands, other provinces or land) 309
20.1 Impacts of the Mine Site (mine, concentration plant): 309
20.2 Impact of the Road..... 309
20.3 Impact of the Port 310
20.4 Impact of Marine Shipping Road..... 311
20.5 Others..... 311
21 Anticipated Changes and Impacts on Indigenous Communities - Physical and Cultural Heritage, Use of Lands and Resources, Historical, Archaeological Significance..... 313
22 Anticipated Changes and Impacts on Indigenous Communities – Health, Social or Economic Conditions 317
23 Greenhouse Gas Emissions and Strategic Climate Change Assessment..... 321
23.1 Greenhouse Gas Emissions (GHG) 321
23.1.1 Data Requirements and Gathering of Quantifiable Data 322
23.1.2 Net Greenhouse Gas Quantification Methodology..... 322
23.2 Direct GHG Emissions..... 323
23.3 Acquired Energy GHG Emissions..... 323
23.4 Avoided Domestic GHG Emissions 323
23.5 GHG Offset Measures..... 323
23.6 Net GHG Emissions..... 323
23.7 Mitigation Measures, Net-zero Plan 324
23.8 Limitations 326
23.9 Resilience to Climate Change 326
24 Waste, Emissions and Discharge..... 329
24.1 Waste Management 329
24.1.1 Solid Waste (domestic and non-hazardous wastes) 329
24.1.2 Hazardous Materials and Hazardous Waste..... 329
24.1.3 Residue from Mining Operation and Concentration Process 330
24.1.4 Residue from Rare Earth Separation Plant (Sept-Îles) 330
24.1.5 Super-bags (FIBC bags) disposal..... 331
24.1.6 Contaminated Soils..... 331
24.1.6.1 Northern Sites (mine and concentration plant, port facilities / container storage and handling facilities on Eastern Labrador) 331
24.1.6.2 Sept-Îles Site 332

24.2 Atmospheric Emissions Management 332
24.2.1 Air Emissions 332
24.2.2 Noise and Vibrations 334
24.2.3 Light Emissions 334
24.2.4 Greenhouse Gas Emissions 334
24.3 Water Management 334
24.3.1 Water in the Lifecycle of a Mine 334
24.3.2 Water Discharges from the Mine and Concentration Plant Site 335
24.3.2.1 Mine Water and Runoff Water Within the Activity Areas (contact water) 335
24.3.2.2 Wastewater from Concentration Processes (process wastewater) 336
24.3.2.3 Washing Water 336
24.3.2.4 Water Treatment Plant (WTP) 336
24.3.2.5 Domestic Wastewater (sewage) 337
24.3.2.6 Discharge Points 337
24.3.3 Water Cycle at the Separation Plant 338
24.3.4 Water Discharges from the Separation Plant and its Process Residue Stockpile Area 338
25 Cumulative Effects 339
25.1 Identification of the VECs Considered 339
25.2 Identification and Justification of the Spatial and Temporal Limits of the Analysis 340
25.3 Effects of the Project on VECs Accrue with the Effects of Other Activities 340
25.4 Identification of Past, Present and Future Activities Potentially Affecting VECs 341
PART G – SUMMARY (Separate Doc) 343
References 345

List of Tables

Table 3-1: Government agencies and other stakeholders consulted between 2011 and 2024 6
Table 3-2: Government agencies and other stakeholders consulted between November 2022 and April 2024 in relation with the implementation of a separation plant 8
Table 3-3: Consultation program with the concerned non-Indigenous communities in Quebec and Labrador 10
Table 3-4 : Preliminary list of groups and organisations by GBA+ stakeholders, per region 11
Table 4-1: Indigenous groups consulted since 2011 in Quebec and Labrador and main issues and concerns discussed 22
Table 4-2: Preliminary consultation program with the concerned Indigenous communities in Quebec and Labrador 27
Table 5-1: Reports completed between 2012 and 2014 as part of the PFS (Dec 2013) and PEA (Nov 2014) 30
Table 7-1 : Comparing Canada's Critical Mineral List (from Annex E of the Canadian Critical Minerals Strategy, Natural Resources Canada, 2022) 34

Table 7-2 : Applications and example end uses in daily life of rare earth elements (REE) (from Project Blue, 2022) 36
Table 9-1 : Current mining plan 46
Table 9-2: Estimated workforce during the construction (number per occupation classification and duration) 85
Table 9-3: Estimated contract labour for the construction (peak number, duration) 86
Table 9-4: Workforce during the operations for all department and project components (mine, road, separation plant) 87
Table 10-1: Estimated quantities (dry tonnes) by type of material (30 years of operation) at the Mine, the Concentration Plant, and the Separation Plant sites 99
Table 11-1: Strange Lake Project Milestones and Dates 103
Table 12-1: Site evaluation matrix - Mine residue stockpile area (conducted in 2015) 107
Table 14-1: Station data for calculating climatic normals in Canada from 1991 to 2020 for Nain and from 1971 to 2000 for Schefferville 134
Table 14-2: Monthly difference of temperature from October 2011 to November 2012 between the mine site and the Nain station 136
Table 14-3: Monthly difference of temperature from October 2011 to November 2012 between the mine site and the Schefferville station 136
Table 14-4: Averages of monthly differences between the mine site and governmental weather stations (Oct 2011 to Nov 2012) 137
Table 14-5: Monthly difference of precipitation from October 2011 to November 2012 between the Schefferville station and the Nain station 137
Table 14-6: Monthly difference of mean hourly wind speed (km/h) from October 2011 to November 2012 between the Mine station and the Environment Canada stations 137
Table 14-7 : Climatic normal at Sept-Îles from 1991 to 2020 139
Table 14-8: 1SLAC granite and recrystallized granite domains, pegmatite, and fracture-controlled sub-domains 146
Table 14-9 : Chemical data 2019 SLAC granite, recrystallized granite and the pegmatite/recrystallized granite fracture controlled sub-domains of the fracture-controlled domain 147
Table 14-10: Ground Motion Values 152
Table 14-11: Ground Motion Values 153
Table 14-12: Number of water crossings along the current road alignments by Province. 156
Table 14-13: Discharge coordinates of water bodies targeted by the dilution factor analysis 164
Table 14-14: Surface water parameters analysed in 2011-2012 at the Mine Site (AECOM, 2013c) 169
Table 14-15: Recommended number of stations based on UVH area in standard and homogeneous vegetation conditions 185
Table 14-16: Amphibians or reptiles potentially present in the insertion area 194
Table 14-17: George River Caribou Herd Demographic Changes 202
Table 18-1: Preliminary List of Federal Permits and Authorizations 256
Table 18-2: Preliminary List of Permits and Approvals for the Nunatsiavut Government 257
Table 18-3: Preliminary List of Permits and Approvals for the Quebec Government (North and South of the 55th parallel) 258

Table 18-4: Preliminary List of Permits and Approvals for the Government of Newfoundland and Labrador 259
Table 19-1: Key environmental issues of the Strange Lake Mining Project 261
Table 19-2: Draft list of critical environmental components, key indicators and project rationale for selection 265
Table19-3: Fish and fish habitat (FAFH) and migratory birds potential change, mitigation measures under the project phases based on the main sources of potential effects. 267
Table 19-4: Preliminary list of potential impacts on physical environment and mitigation measures (development and construction phases) 273
Table 19-5: Preliminary list of potential impacts on biological environment and mitigation measures (development and construction phases) 280
Table 19-6: Preliminary list of potential impacts on the social environment and proposed mitigation measures (development and construction phases) 284
Table 19-7: Preliminary list of potential impacts on physical environment and mitigation measures (operational phase) 290
Table 19-8: Preliminary list of potential impacts on biological environment and mitigation measures (operational phase) 297
Table 19-9: Preliminary list of potential impacts of marine shipping on marine environment and mitigation measures (construction and operational phases) 301
Table 21-1: List of anticipated changes and impacts on Indigenous communities - physical and cultural heritage, use of lands and resources 314
Table 22-1: List of anticipated changes and impacts on Indigenous communities – health, social and economic conditions 319
Table 23-1: Emission Factors 323
Table 23-2: GHG Emission Values 324
Table 23-3: SACC. *Equation 1* - Net GHG emissions calculation 324
Table 24-1 : Recommended increases (%) to be applied to IDF curves in reference climate (2000-2019) for estimating IDF curves for various future periods according to SSP5- 8.5 scenario 335
Table 24-2 : Projected short duration rainfall intensity-duration-frequency for SSP5-8.5 for the horizon 2071-2100 336

List of Figures

Figure 7-1 : Canada's critical Minerals and Dome of their Uses (from The Canadian Critical Minerals Strategy, p.9, Natural Resources Canada, 2022) 34
Figure 7-2 : A) Short-term (2020-2025) and B) Long-term (2025-2035 criticality matrix for key materials (from USDOE, 2023) 35
Figure 7-3 : Rare Earth Demand by Volume and Value in 2022 (Project Blue) 37
Figure 9-1 : Mine pit options (by DRA, 2023) 63
Figure 9-2: Schematic cross sections of the access road. The road design will evolve during the project feasibility study 76
Figure 9-3: Preliminary design for new port facilities in Voisey's Bay 79
Figure 9-4 : Overview of the separation plant site and of the residue storage area in Sept-Îles 83

Figure 10-1: Simplified acid baking (sulfation) and calcination process flowsheet- 96
Figure 13-1 : Land on which the separation plant and residue stockpile area would be built 118
Figure 14-1 : Weather station installed at the mine site in the fall 2023 135
Figure 14-2 : Weather station installed at the mine site in September 2011 136
Figure 14-3: Wind rose at the hourly scale at the mine site, Nain station and Schefferville station. 138
Figure 14-4 : Longitudinal section of the 2019 geological model and mineral resource domains. 145
Figure 14-5 : 2023 Update interpretation of the fracture-controlled B Zone sub-domain 148
Figure 14-6: Major seismic events in a 400 km radius from the mine site since 1985 149
Figure 14-7 : Major seismic events in a 400 km radius from Sept-Îles since 1985 150
Figure 14-8 : Localization of the mine site and Sept-Iles on the seismic hazard map (modified from Natural Resources Canada, 2024a). 151
Figure 14-9: Seismic hazard values intended for the 2005 NBCC "Design Data for Selected Locations in Canada" table. Sa : spectral acceleration given in units of g (acceleration due to Earth's gravity). 152
Figure 23-1 : Steps of the BAT/BEP Process 325

List of Maps

Map 3-1: Indigenous Land Rights 13
Map 3-2: Communities in the Project Area in the North 15
Map 3-3: Communities in the Project Area in Sept-Îles 17
Map 9-1: Overall Project Map 47
Map 9-2: Project Components in the North 49
Map 9-3: Mine Site Components – Option A (20 years) (Global) 51
Map 9-4: Mine Site Components – Option A (5 years) 53
Map 9-5: Mine Site Components – Option A (20 years) 55
Map 9-6: Mine Site Components – Option B (20 years) 57
Map 9-7: Mine Site Components – Option C (20 years) 59
Map 9-8: Project components in Sept-Îles 61
Map 12-1 : Single Lane Road Access Studied Options 111
Map 13-1: Northern Components Preliminary Project and Local Study Area 119
Map 13-2: Sept-Îles Components Preliminary Project and Local Study Area 121
Map 13-3: Preliminary Regional Study Area 123
Map 13-4: Torngat Metals Ltd's claims 125
Map 13-5: Strange Lake Alkaline Complex and Bedrock Geology 127
Map 14-1 : Watersheds Within the Project Area in the North 157
Map 14-2 : Natural Environment of the Bay of Sept-Îles 159
Map 14-3 : 2023 Sampling Stations and Surveys at the Mine Site 165

Map 14-4: Land Regions and Districts 181
Map 14-5: Caribou Protection Areas 205
Map 14-6 : Proposed Marine Shipping Route 211

List of Appendices

Appendix A Summary of Issues- Questions and Answers
Appendix B List of the Information and Consultation Activities Held by Torngat Metals with the Indigenous Groups and Stakeholders since 2022
Appendix C Communication Materials
Appendix D Geochemical Characterization Program, General Water Balance and Surface Water Balance
Appendix E Water Crossings Along the Access Road (15 sheets and aerial photos for Quebec Road Access)
Appendix F 2023 Results- Surface Water Characterization at the Mine Site
Appendix G Project Components (58 sheets at 1:12 500)
Appendix H Maps of Indigenous Land Use from the 2012-2013 AECOM Study

Cover Letter (Separate Doc)

Introduction

Torngat Metals Ltd. (hereinafter referred to as "**Torngat Metals**") is a private Canadian company headquartered in Montreal. The project is a rare earth elements mining project in the Strange Lake deposit in Quebec, located 235 km northeast of Schefferville and 125 km west of Vale's nickel-copper mine near Nain in Labrador. Guided by IESG standards, Torngat Metals Ltd. aims to be recognized as a socially and environmentally responsible supplier of rare earths for the electric mobility, renewable energy, and other low-carbon footprint markets. Rare earths are essential to the decarbonization of our societies, and without them the transition to a green energy will be very difficult. To date over 85% of the market is controlled by China. The proposed mine and processing facilities will be key to the stabilization of the supply chain, ensuing North America controls of its supply of rare earth. The deposit of Strange Lake is one of the richest deposit in the world and contains large quantities of the four rare earth that produces the magnets necessary for EV motors. There are also eight other useful rare earth that are necessary for colours in smart phones and tablets, making flat screens possible and also key to medical equipment.

In general terms, the Strange Lake Rare Earth Mining Project (hereinafter referred to as "**Strange Lake Project**") includes the following elements:

- **Mine site** (Quebec, north of the 55th parallel):
  - Construction, operation, closure and restoration of a new mining complex, including:
  - Open-pit mining of a rare earth elements deposit (Zone-B): 30 years of operation is currently being considered.
  - Concentration plant.
  - Related infrastructure: waste rock and overburden stockpiles, low-grade stockpiles, residues stockpile, water management ponds and treatment facilities, permanent camp, office and warehouse buildings).
  - Aerodrome with a runway length of 1 500 m.
- **Single Lane Access road:** The single lane access road is approximately 160 km long. It extends between the mining site and the eastern coast of Labrador where port facilities will facilitate the transportation of concentrate by trucks to the barges.
  - Province of Quebec: The first 18 kilometers from the mine site are located within the territory of the province of Quebec.
  - Province of Newfoundland and Labrador, region under Labrador Inuit Settlement Area (LISA) and LIL (Labrador Inuit Land): Outside the mine site, the preliminary design includes a seasonal and private single lane access road of approximately 140 km. Two options are currently studied (Option A and Option C), with a different number of water crossings. For Option C, two alignments are still presented and mapped in order to outline a broader study area for the access road, as the preliminary engineering design is still ongoing this spring prior to field surveys. One alignment (Option C1) aims to minimize water crossings and its alignment is further away from major streams and rivers, whereas the Option C2 has been drafted as a low constructability road (easy build-up, with no large cut and fills, forestry type).
- **Port facilities with storage and handling:** The concentrate packed in bags and then in containers will be transported by trucks to a storage and handling facility on the east coast of Labrador. Two sites are studied depending on the marine site targeted from the two options of the single lane access road.
  - Option A access road: The proposed site is a new container depot near the existing port of Vale's nickel-copper mine in Anaktalak Bay, NL[1];
  - Option C access road: New port facilities would be built in Voisey's Bay, south of the mining area operated by Vale, in Labrador. The exact location is still to be determined.

[1] Although the Vale mine site is named Voisey's Bay, its port is located in Anaktalak Bay, just to the north.

- **Transportation by container ships of the concentrate to a separation plant:** The concentrate, still packed in bags and then in containers will be transported to a pre-existing industrial port area in Sept-Îles, QC.
  - Transportation by ships from the port facilities on the eastern coast of Labrador to a pre-existing industrial port area in Sept-Îles, QC.
- **Rare earth separation plant:** The rare earth elements will be separated into oxides at a new separation plant that will be built in the "Parc industriel ouest – Jonction Arnaud" (also known as "Parc industriel Vigneault") of the Sept-Îles industrial port facility (QC).

The Section 8 *Applicable Provisions* details the activities of the project. Section 18 also addresses the *Implication of other Jurisdictions in the Project's Assessment.*

This document serves as the Detailed Project Description (DPD) as part of IAAC's requirements. The requirements for the DPD are set out in Section 4 and Schedule 2 of the *Information and Management of Time Limits Regulations* (SOR/2019-283) of the Impact Assessment Act*.* Nevertheless, given the current Supreme Court ruling on the Canadian Impact Assessment Act, there is no longer a 30-day period for providing the DPD from the submission of the Summary of Issues. The Summary of Issues was published on the Canadian Impact Assessment Registry on December 23 2023 in English, and on January 23 2024 in French.

Content from the previous Registration Document (NG, NL) / Initial Project Description (IDP) (published on September 30 2023) was updated accordingly to be representative of the project, and the sections do comply with the *Guide to Preparing an Initial Project Description and a Detailed Project Description*.

The description of how Torngat Metals intends to address each of the issues raised in the Summary of Issues is presented in the document "Answers to Summary of Issues" available in Appendix A. Part B of the DPD corresponds to the *Planning phase results,* which include the summaries of the results for the engagement activities, including the information and consultation carried out with any jurisdiction or other party in the north and in the vicinity of Sept-Îles (Section 3), as well as the consultations activities carried out with the Indigenous groups (Section 4).

PART A – GENERAL INFORMATION

1 Project Name

The title of the project is “Strange Lake Rare Earth Mining Project”.

In this document, the short title “Strange Lake Project" is used to simplify the text.

2 Identification of Proponent and Representative

2.1 Proponent Identification

The promoter is **Torngat Metals Ltd.** (hereinafter named Torngat Metals), a Canadian exploration company currently focused on developing its main project, the Strange Lake property in northeastern Quebec. A current update statement has been made to formalize the corporate name change from Quest Rare Minerals Ltd. to Torngat Metals Ltd or Métaux Torngat Ltée.

Name of promoter:	**Torngat Metals Ltd.**
Address (head office):	625 Avenue du President Kennedy, suite 605 Montreal, Quebec H3A 1K2
Chief Executive:	
Name:	Dirk Naumann, Ph.D.
Title:	President and Chief Executive Officer (CEO)
Address:	625 Avenue du President Kennedy, suite 605 Montreal, Quebec H3A 1K2
Phone number:	1 (613) 532-8232
Email address:	dirk.naumann@torngatmetals.com

Responsible for the environmental assessment of the project:

Name:	Sylvie St-Jean
Title:	Vice-President Environment
Address:	625 Avenue du President Kennedy, suite 605 Montreal, Quebec H3A 1K2
Telephone number:	1 (807) 707-3497
Email Address:	sylvie.stjean@torngatmetals.com

2.2 Representative Identification

Consultant: **AECOM Consultants Inc.**

Address: 85, Ste-Catherine Street West
Montreal, Quebec H2X 3P4

Project Responsible: Sonia Labrecque, biol. Project Manager

Telephone number: 1 (581) 996-4735 (cell)
Fax number: 1 (418) 647-1011
Email Address: sonia.labrecque@aecom.com

Quebec entreprise number (NEQ): 1161553129

PART B – PLANNING PHASE RESULTS

3 Summary of the Results of Engagement Activities with any Jurisdiction or Other Party

This section presents the engagement activities and plans carried out with Government agencies and other stakeholders. The engagement activities and plans carried out with Indigenous communities and partners are presented in Section 4.

The tables presented in this section are a summary of the information and consultation activities conducted to date. The Appendix B presents a complete list of the information and consultation activities hold by Torngat Metals with the Indigenous and non-indigenous stakeholders since 2022[2]. Appendix C presents examples of the communication materials used in these activities.

The following maps are included in Section 3 to ease the understanding of the project components in the territory.

- Map Indigenous Land Rights - Quebec (Map 3-1)
- Map Communities in the Project Area in the North (Map 3-2)
- Map Communities in the Project Area in Sept-Îles (Map 3-3)

3.1 Information and Consultation Activities Carried Out

A mapping of the project's stakeholders was carried out, taking into account the various project components, i.e. the planned mine, the planned road and port, and the planned separation plant. Obviously, some stakeholders are involved in several or all of the project components, while others are involved in only one.

The mine site is located on category III Land, that are subject to James Bay and Northern Quebec Agreement. This agreement governs land claims and Indigenous rights of the Nunavik Inuit and of the Naskapi Nation of Kawawachikamach. The mine site is covered by the administrative region of Nord-du-Québec and the Kativik Regional Government, located in Kuujjuaq, 325 km Northwest of the mining site.

Option A of the Access Road and the Port of Vale storage and handling facilities are located on Crown Lands of Newfoundland and Labrador, as well as Labrador Inuit Lands, the Labrador Inuit Settlement Area and the Voisey's Bay region of the Nunatsiavut Territory (Map 3-1). Access Road Option A and storage and handling facilities are under the administration of the Government of Newfoundland and Labrador and the Nunatsiavut Government.

Both Option C (C1 and C2) of the Access Road and the Voisey's Bay port facilities are located on Crown land in Newfoundland and Labrador. Option C of the road passes through Labrador Inuit Settlement Area and Labrador Innu Settlement Area Land Claims Agreement-in-Principle (New Dawn Agreement). The Voisey Bay port facilities are located in the region covered by the Labrador Inuit settlement area and Labrador Innu Settlement Area of the Labrador Innu.

The concentrate produced by the mine will be sent the separation plant located in Sept-Îles, Quebec, to prepare the final products, which are the rare earth oxides. This separation plant is covered by the administration of the Quebec Government.

[2] Torngat Metals does not hold a complete list of information and consultation activities carried out by the previous administration prior to this period.

3.1.1 Results of Consultation Activities Carried out for the Northern Components of the Project (mine, road to the eastern coast of Labrador)

As part of the Strange Lake Project, Torngat Metals (previously Quest Rare Minerals) has presented the Project to various government stakeholders at the federal and provincial (Quebec and Newfoundland and Labrador) levels and to Indigenous governments (Nunavik and Nunatsiavut) since 2011. Several engagement activities have also been carried out with various stakeholders, mainly Indigenous groups from Quebec and Labrador (engagement activities carried out with Indigenous groups are presented in Section 4).

Engagement activities have also been carried out with non-Indigenous stakeholders, such as government representatives, outfitters and businesses that may have an interest in participating in the project.

Table 3-1 provides a summary of government, and other stakeholder groups consulted to date, as well as the issues and concerns discussed with them. Map 3-2 outlines the northern communities in the project area.

Table 3-1: Government agencies and other stakeholders consulted between 2011 and 2024

Type of stakeholder	Date	Stakeholders	Issue / concern discussed
Federal government Initial project presentation, follow-up meetings and communications, environmental assessment process	2011 – 2024 (ongoing)	– Bureau de gestion des grands projets (BGGP) – Representatives of the Canadian Environmental Assessment Agency (CEAA) / Impact Assessment Agency of Canada (IAAC)[3] – Natural Resources Canada (NRCan) – Innovation, Science and Economic Development Canada – NSERC – Canadian Nuclear Safety Commission (CNSC) – Minister of Labour – Minister of Rural Economic Development – Atlantic Canada Opportunties Agency (ACOA) – Canada Infrastructure Bank	– Project seen as important for the Canadian Critical Minerals Strategy – Interest in understanding all the potential project benefits, including exploring potential strategic opportunities that the project could enable, e.g. foundation of rare earth industry and downstream supply chain; future opportunity for an access road to become a resource corridor and route for electricity transmission. – Project seen as potentially meeting criteria of multiple funding programs
Quebec government Initial project presentation, follow-up meetings and communications, environmental assessment process	2011 – 2024 (ongoing)	– Division des mines du ministère des Ressources naturelles – Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (MDDEFP) – Ministère de l'Environnement, de la lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP) – Secrétariat aux Affaires autochtones du Québec – Investissement Québec – Société du Plan Nord	– Project seen as important for the Quebec Plan for the Development of Critical and Strategic Minerals – Interest in understanding all the potential project benefits, including exploring potential strategic opportunities that the project could enable, e.g.foundation of rare earth industry and downstream supply chain – Project seen as potentially meeting criteria of multiple funding programs

[3] The meetings carried out with IAAC dealt specifically on the requirements of the federal impact assessment process, including the potential project effects.

Table 3-1: Government agencies and other stakeholders consulted since 2011 (Cont'd)

Type of stakeholder	Date	Stakeholders	Issue / concern discussed
Newfoundland and Labrador government Presentation of the proposed project; consultation plans; mobilization plans for Indigenous populations; environmental assessment process	2011 – 2024 (ongoing)	– Premier of Newfoundland and Labrador – Minister, Deputy Minister, Assistant Deputy Minister of Industry, Energy and Technology responsible for Mining and Mineral Development – Minister, Deputy Minister, Assistant Deputy Minister, and Director of the Department of Indigenous Affairs and Reconciliation; Labrador Affairs; Assistant Parliamentary Leader; Secretariat of Labrador Affairs – Executive Council – Director of Environmental Assessment and officials from the Department of Environment and Climate Change	– Project seen as important, and to have input into the Province's critical minerals strategy in development
Other non-Indigenous stakeholders	2014 – 2024	– Municipality of Schefferville – Outfitters – Businesses interested in participating in the project including Labrador North Chamber of Commerce, Indigenous business groups – Quebec Mineral Exploration Association (QMEA) – Other mining and metallurgical companies – Several universities and colleges, e.g. College of North Atlantic (CNA) – Building Trades Council – Senator of Newfoundland and Labrador; Chairman of the Fisheries and Oceans Committee – Newfoundland and Labrador Hydro	– Employment opportunities – Indigenous employment – Business and procurement – Innovation in mining (CNA) – Industrial participation in research projects – Opportunity to assess core samples (CNA) – Access to and availability of electricity

3.1.2 Results of Consultation Activities Carried out for the Separation Plant

Consultation activities were carried out as part of the site selection process for the separation plant. Three potential sites were initially identified in the industrial port zones of Sept-Îles, Baie-Comeau and Saguenay. Meetings have been held with the relevant authorities between November 2022 and mid-2023, which allowed for onsite meetings with site managers, local and administrative authorities in each region. Preliminary contacts were also made with some Indigenous representatives of Sept-Îles area, although not exhaustive at this preliminary stage. After a comparative evaluation of the sites, it was decided to concentrate efforts on two sites, namely Sept-Îles and Saguenay, and the discussions continue with the stakeholders. In July of 2023 several meetings were held with representatives, Sept-Îles was designated as the preferred site. Discussions with the local authorities are underway in order to sign a letter of understanding in order to negotiate terms.

At the end of 2023, an information and consultation plan has been developed and currently implemented in the Sept-Îles area. Map 3-3 outlines the communities in the Sept-Îles surroundings. Since the beginning of 2024, many information and consultation activities have been realized with both Indigenous and non-Indigenous stakeholders in the region of Sept-Îles.

Meetings were held with the municipality of Sept-Îles (mayor and councillors) and the following stakeholders: Port Authority; Chamber of Commerce; environmental groups (Conseil regional de l'environnement de la Côte-Nord et Corporation de protection de l'environnement de Sept-Îles), educational institutions (Cégep and Centre de formation professionnelle); unions (FTQ); federal and provincial Members of Parliament; Société de développement économique and the Bureau de protection du territoire de Uashat mak Mani-Utenam. In addition to these face-to-face meetings, Torngat Metals held two public meetings in April 2024 and conducted a media interview campaign to inform as many people as possible interested in and affected by the Sept-Îles separation plant project.

Table 3-2 presents the stakeholders met between November 2022 and April 2024 and the issues and concerns discussed.

Table 3-2: Government agencies and other stakeholders consulted between November 2022 and April 2024 in relation with the implementation of a separation plant

Type of stakeholder	Date	Stakeholder	Issue / concern discussed
Federal government Initial project presentation, site selection, follow-up meetings and communications	March 2024	– Member of Parliament and deputy of Manicouagan	– Importance to keep the population informed on the project and conduct a robust consultation of the different types of stakeholders. – Address environmental and social issues such as water management, radioactivity and economic benefits.
Quebec government Initial project presentation, site selection, follow-up meetings and communications	November 2022 – 2024 (ongoing)	– Investissement Québec – Société du Plan Nord – Division des mines du ministère des Ressources naturelles – Member of Parliament and deputy of Duplessis	– Project seen as important for the Quebec Plan for the Development of Critical and Strategic Minerals – Interest in understanding all the potential project benefits, including exploring potential strategic opportunities that the project could enable, e.g.foundation of rare earth industry and downstream supply chain – Project seen as potentially meeting criteria of multiple funding programs – Importance to keep the population informed on the project and conduct a robust consultation of the different types of stakeholders.
Local stakeholders – Sept-Îles Initial project presentation, site selection, follow-up meetings and communications	December 2022 – 2024 (ongoing)	– Développement Économique Sept-îles – Port de Sept-Îles – City Council of Sept-Îles (Mayor, Councillors and General Manager) – Chamber of commerce of Sept-Îles and Uashat mak Mani-Utenam – Société de Développement Économique de Uashat Mak Mani-utenam (SDEUM) – Bureau de protection du territoire de Uashat mak Mani-Utenam – Cégep de Sept-Îles – Centre de formation professionnelle de Sept-Îles – Conseil régional de l'environnement Côte-Nord	– Project is seen as potentially providing the type of significant economic development opportunity to meet their needs, as long as environmental and social concerns are addressed. – Importance to keep the population informed od the project and conduct a robust consultation of the different types of stakeholders. – Concerns regarding environmental and social issues such as water management, dust control, radioactivity (human health). – Discussion on the location of the plant and residue pile location – Concerns about the value of the property located nearby of the proposed plant and residue pile location. – Concerns about the housing shortage in Sept-Îles. – Concerns about the negative impacts of fly in – fly out.

Table 3-2: Government agencies and other stakeholders consulted between November 2022 and April 2024 in relation with the implementation of a separation plant (Cont'd)

Type of stakeholder	Date	Stakeholder	Issue / concern discussed
Local stakeholders – Sept-Îles Initial project presentation, site selection, follow-up meetings and communications **(Cont'd)**		– Corporation de protection de l'environnement de Sept-Îles – FTQ Région Côte-Nord – Sept-Îles population (2 public assemblies in April 2024)	– Necessary dialogue with Indigenous groups. – Interest to develop the rare earth industry in Sept-Îles (expertise and high-skill jobs).
Local stakeholders – Baie-Comeau Initial project presentation, site selection, follow-up meetings and communications	December 2022 and February 2023	– Innovation et développement Manicouagan (CLD) – Corporation de gestion du port de Baie-Comeau (CGPBC) – Ville de Baie-Comeau	– Project is seen as potentially providing the type of significant economic development opportunity to meet their needs, as long as environmental and social concerns are addressed
Local stakeholders – Saguenay Initial project presentation, site selection, follow-up meetings and communications	November 2022 – mid-2023.	– Promotion Saguenay – Administration Portuaire du Saguenay	– Project is seen as potentially providing the type of significant economic development opportunity to meet their needs, as long as environmental and social concerns are addressed

3.2 Planned Information and Consultation Activities during the Conduct of the Environmental and Social Impact Study

As part of the environmental and social impact study, Torngat Metals plans to conduct additional information and consultation activities with institutional stakeholders, communities, non-governmental groups or associations, and other stakeholders affected by the project.

Pre-consultation activities (prior to the impact study phase) carried out identified several technical, economic and social issues (see Table 3-2) for which Torngat Metals intends to pay particular attention during the consultation phase to be conducted during the impact study. Torngat Metals will adopt an approach based on the analysis of the project's impacts on the quality of life of the population, a holistic approach aimed at documenting the various determinants valued by the population, including the quality of the natural environment, access to quality services and economic opportunities. The consultation plan will also need to reach out to a diversity of stakeholders, especially those who generally find it difficult to make their voices heard in this type of process.

Lastly, consultation activities are carried out in the specific context of the environmental and social studies required to describe the host environment. Several stakeholders will therefore be consulted on this subject over the coming weeks and months, in order to gather the information and data required for impact analysis.

Without limitation, Torngat Metals plans to carry out the following activities:

- Consultation with government ministries and agencies to obtain basic data for conducting studies on the physical, biological, and social environment.
- Consultation with non-Indigenous communities, such as Schefferville, Fermont, Labrador West, Goose Bay, Sept-Îles, that combines various techniques: village assemblies, interviews with target groups (territorial users, elders, youth, men, women), individual interviews with key stakeholders within communities (local administration services).

- Consultation with other key stakeholders such as environmental groups, chambers of commerce, citizens' associations, outfitters and other stakeholders still to be identified to integrate their expectations and concerns into the project.
- Establishment of consultation and grievance mechanisms allowing members of communities to express their questions and views online.

All results of these consultation activities will be recorded in the stakeholder management system developed by Torngat Metals as part of the project.

The following table presents a preliminary program to conduct consultation activities with the concerned non-Indigenous communities in Quebec and Labrador during the ESIA process.

Table 3-3: Consultation program with the concerned non-Indigenous communities in Quebec and Labrador

Projected Period	Stakeholder	Activity
Q2-Q3 2024	– Community associations representing or working with specific groups (GBA+, such as women, youth, elder, unemployed, etc.) in Sept-Îles, Schefferville, Fermont Labrador West and Goose Bay. – Environmental and citizen groups in Sept-Îles, Schefferville, Fermont Labrador West and Goose Bay. – Ongoing dialogue with key stakeholders such as local authorities.	Face to face meetings and focus groups to gather socio-economic data and identify expectations and concerns.
Q4 2024	– Population of Sept-Îles, Schefferville, Fermont, Labrador West and Goose Bay	Community assemblies to present update on the project and the consultation findings, to identify additional community expectations and concerns, and potential avoidance and mitigation measures.
Q1 – Q2 2025	– Stakeholders met during the consultation phase.	Feedback on the results of consultation activities with all stakeholders prior to submission of the impact study.

The following Table 3-4 shows the results of our preliminary research by gender-based analysis plus, GBA+ stakeholders and will be completed during further research and future discussions with these groups and associations.

Table 3-4 : Preliminary list of groups and organisations by GBA+ stakeholders, per region

Region / Community	Group / Association
Quebec Indigenous Communities and Nunavik Inuit Communities	• **Ungava Supervised Apartments:** Provide an affordable place to stay for individuals with mental-health problems and intellectual deficiencies. • **Tungasuvvik Women's Shelter:** Provides physical and psychological support to women and their children who are victims of domestic violence and abuse and experiencing difficulties. • **Qajaq Network:** Seeks to help men who are on a personal growth journey or who are experiencing difficulties. • **Isuarsivik Treatment Centre:** Provides a culturally based wellness program to help Inuit adopt a healthy, addiction-free lifestyle. • **Tusaajiapik Day Centre:** Provides support for elders and individuals lacking autonomy. • **Qarjuit Youth Council:** Provides a forum for Inuit youths of Nunavik where they can express themselves on social issues and well-being. • **Qarmaapik House:** Provides a safe place for youths to reside when they are not safe in their family home in Kangiqsualujjuaq. • **Uashat mak Mani-Utenam Youth Secretariat:** Develops youth leadership and gives them a voice in First Nations and non-Indigneous government organizations. • **Saturviit Inuit Women's Association of Nunavik**: Reaches out to Nunavik's 14 communities and to Inuit women who have migrated south. • **Nunavik Youth House Association** • **Friendship Centers** (various locations)
Quebec Non-Indigenous Communities (Sept-Iles/Schefferville/ Fermont)	• **Maison d'aide et d'hébergement- Women's Shelter, Fermont** • **Maison des jeunes Alpha Youth Center, Fermont** • **Association des femmes unies de Sept-Îles** : Brings together women from all communities (Quebec, Innu and African). • **Autour d'Elles, Sept-Îles**: Shelter for women and their children who are victims of domestic violence. • **Envol**, **Family Center**, **Sept-Îles** : Strives to improve the situation of families in difficulty. • **Hommes Sept-Îles**: Provides support to men and fathers by offering support and enhancement services. • **Âtre de Sept-Îles** : Offers housing, living environment and supervised apartments for people living with a mental health problem. • **Transit Sept-Îles:** Welcomes, supports, houses people experiencing homelessness and/or social emergencies.
Indigenous and Inuit Communities of Labrador	• **Labrador Friendship Centre** • **Pauktuutit, Inuit Women of Canada:** Fosters awareness of the needs of Inuit women, advocates for equality and social improvements and engages men and boys in social programs. • **AnânauKatiget Tumingit Regional Inuit Women's Association Inc.**: Represents Labrador Inuit Women with the goal of advancing equal participation in all aspects of society. • **Daughters of Mikak:** Celebrating Inuit Women's Leadership in Nunatsiavut focuses on encouraging people to share stories that honour Nunatsiavut women. • **Provincial Indigenous Women's Steering Committee (PIWSC):** A group of nine Indigenous organizations and governments which support of the provincial Office of Women and Gender Equality. • **Nukum Munik Shelter**: Provides domestic Violence Help in Sheshatshui.

Table 3-4 : Preliminary list of groups and organisations by GBA+ stakeholders, per region (Cont'd)

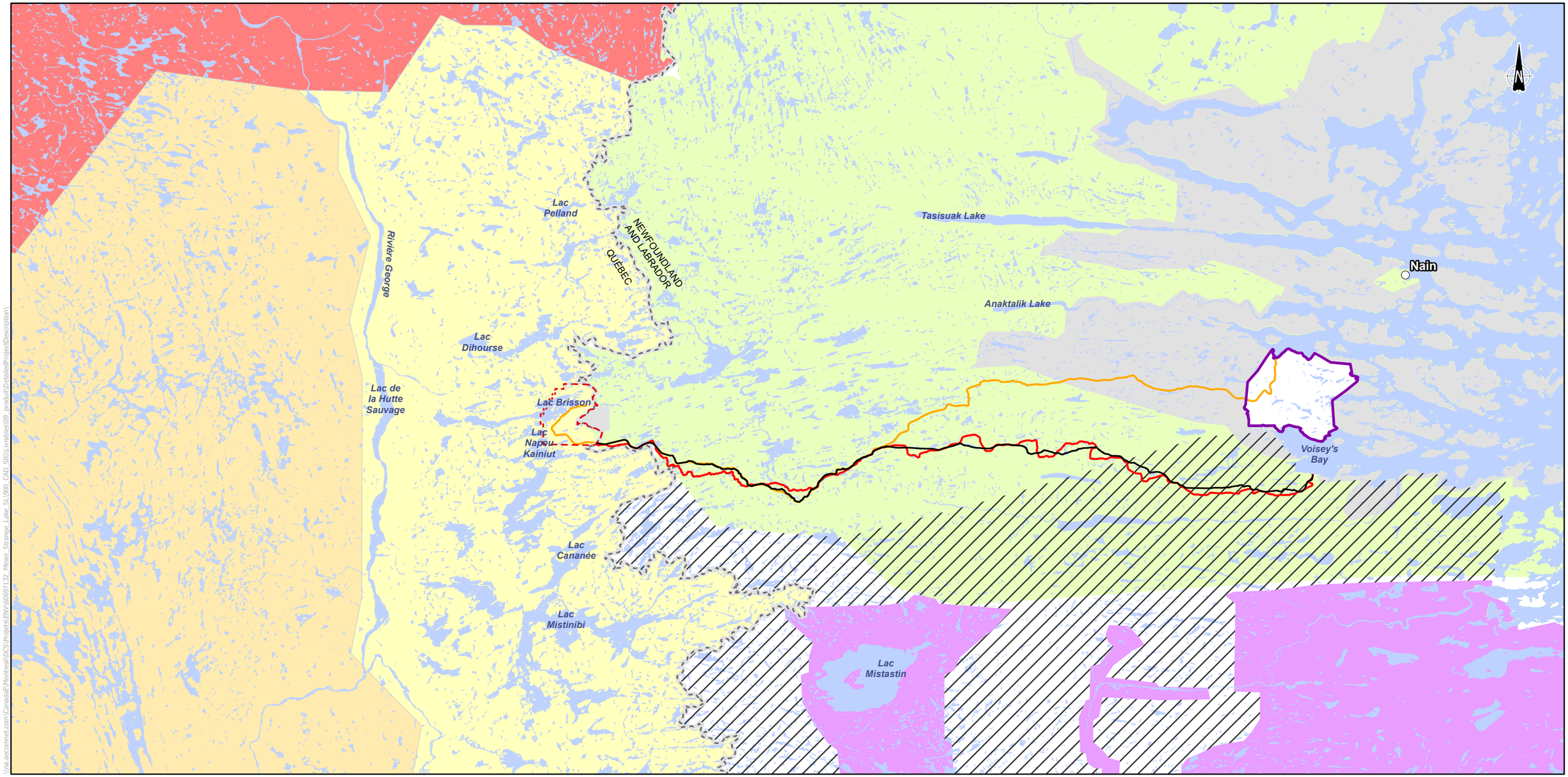
Region / Community	Group / Association
Non-Indigenous Communities of Labrador	• **Mokami Status of Women:** An equality seeking, feminist organization that supports women and gender diverse individuals. • **Independent Living Resource Centre Newfoundland and Labrador :** A consumer-controlled organization committed to providing supports, resources, and opportunities for empowerment, which enable persons with disabilities to make informed choices about their lives. • **Office of Women and Gender Equality** in the government of NL. • **Violence Prevention Labrador**: Focuses on increasing awareness and attitudinal change and improving legislation, policy, programs, services, information, and facilities.

3.3 Answers to Summary of Issues

Following the publication of the Initial Project Description (IPD) in September 2023 and the engagement and consultation activities conducted by the Impact Assessment Agency of Canada (IAAC), a Summary of Issues was published on the Canadian Impact Assessment Registry on December 23, 2023 (English version) and January 23, 2024 (French version). The description of how Torngat Metals intends to address each of the issues raised is presented in the document "Answers to Summary of Issues" available in Appendix A of the Detailed Project Description (DPD).

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



INUIT DU LABRADOR / LABRADOR INUIT

Accord sur les revendications territoriales (2005) / Land Claims Agreement (2005) [1]

- Terres des Inuit du Labrador / Labrador Inuit Lands
- Limite de la zone LISA / Labrador Inuit Settlement Area
- Zone de Voisey Bay (exclue de LISA) / Voisey's Bay Area (excluded from LISA)

INNU DU LABRADOR / LABRADOR INNU NATION

Accord sur les revendications territoriales (2011) / Land Claims Agreement In Principle (2011) [2]

- Catégorie I / Category I
- Catégorie II / Category II

INUIT ET NASKAPI DU QUÉBEC / QUEBEC INUIT AND NASKAPI

Accord sur les revendications territoriales / Land Claims Agreement (1975) [1 and 2]
Terres de catégorie III / Category III Lands

- Droit d'usage prioritaire Inuit / Area of Primary Interest of the Inuit
- Droit d'usage prioritaire Inuit et Naskapi / Area of Common Interest for the Inuit and Naskapi
- Droit d'usage prioritaire Naskapi / Area of Primary Interest of the Naskapi

[1] *Labrador Inuit Land Claims Agreement (LILCA), Regional Planning Authority, 2008.*

[2] *Labrador Innu Land Claims Agreement in Principle (AIP), 2011.*
Note : This AIP only concerns the Newfoundland and Labrador portion of the Labrador Innu land claim, which extends in Quebec.

[1] *James Bay and Northern Quebec Agreement (JBNQA), 1975.*
[2] *Northern Quebec Agreement (NEQA), 1978.*

Note: Ces limites sont approximatives dû à l'échelle des cartes de référence et à la largeur des limites tracées.
These boundaries remain approximate due to the scale of source maps and the width of the boundaries drawn.

Composantes du projet / Project Components

- Limite des concessions d'exploration minières détenues par Métaux Torngat / Outline of Torngat Metals Mineral Exploration Claims

Route d'accès à une voie / Single Lane Access Road

- Option A
- Option C2
- Option C1

Autre / Other

- Frontière Québec et Labrador / Quebec and Labrador border

1:700 000

0 5 10 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic Data: NRCan, (2022)

Carte 3-1
Droits territoriaux autochtones

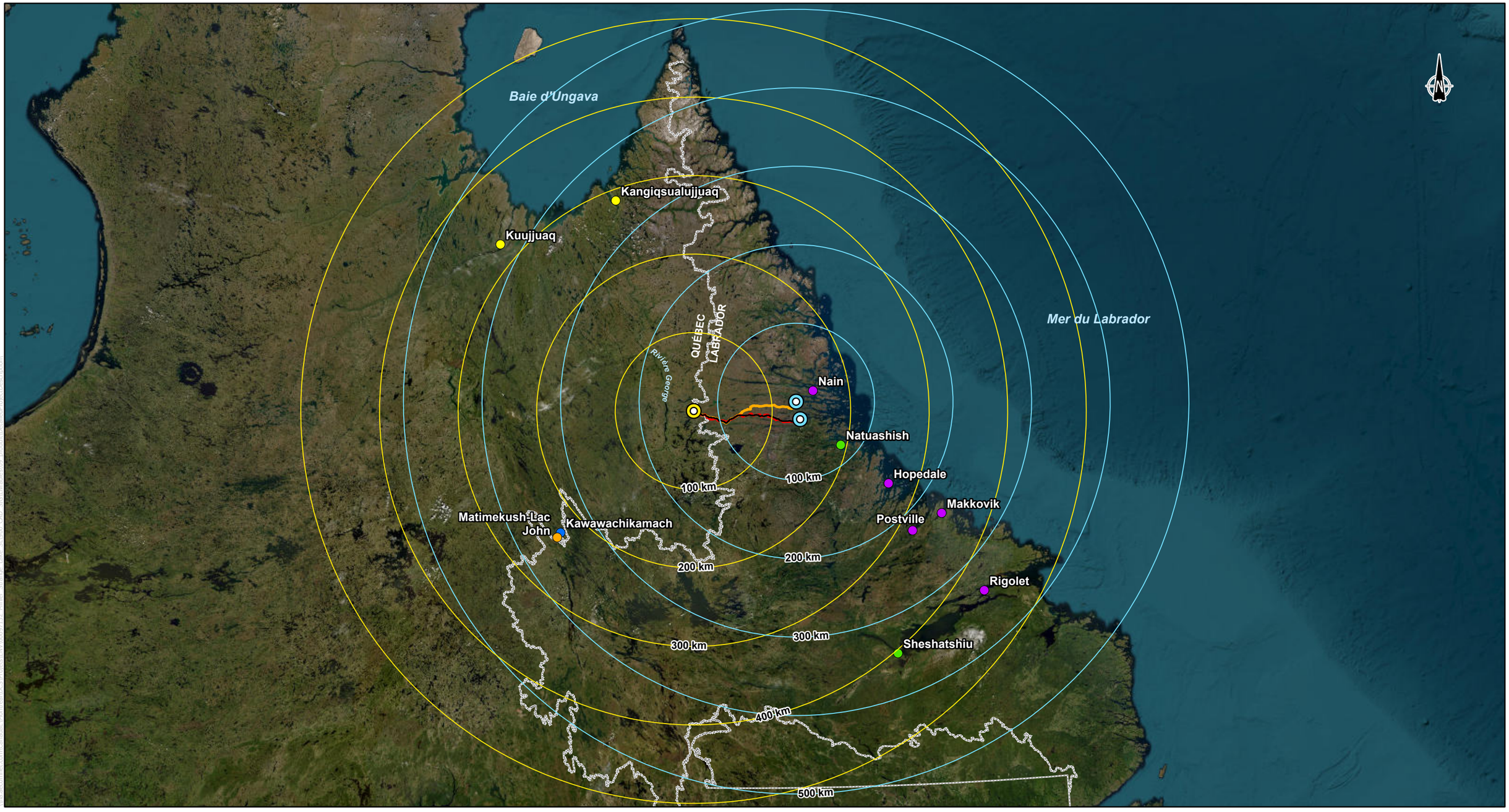
Map 3-1
Indigenous Land Rights

AECOM

\\ca.aecomnet.com\Canada\Montreal\DCS\Projects\ENV\60697132_Mmer_Strange_Lake_SL\900_CAD_SIG\Layouts\09_produit\Detailed\ProjectDescription\

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composantes du projet / Project Components

- Site potentiel des installations portuaires / Potential site for Port Facilities
- Mine et usine de concentration (Lac Brisson) / Mine and Concentration Plant (Lac Brisson)

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Communauté / Community

Québec
- Innu
- Inuit
- Naskapi

Labrador
- Innu
- Inuit

1:4 700 000

0 50 100 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic Data: NRCan (2022)

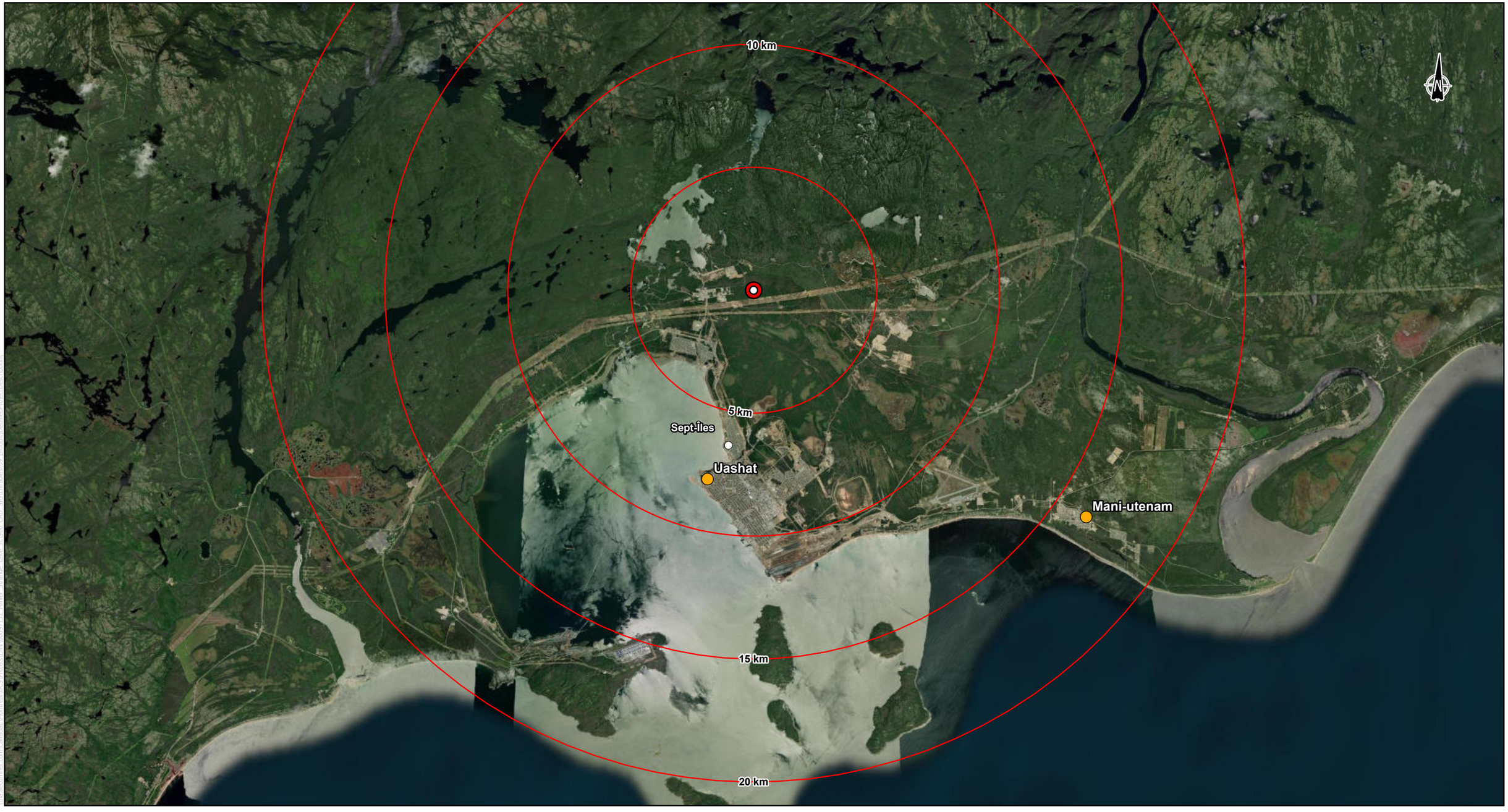
Carte 3-2
Communautés dans le secteur du Projet au Nord

Map 3-2
Communities in the Project Area in the North

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composantes du projet / Project Components

Site potentiel de l'usine de séparation des terres rares (Sept-Îles) /
Potential Site of the Rare Earth Separation Plant (Sept-Iles)

Communauté / Community

Québec

Innu

1:150 000

0 2 4 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic Data: NRCan (2022)

Carte 3-3
Communautés dans le secteur du Projet à Sept-Îles

Map 3-3
Communities in the Project Area in Sept-Îles

AECOM

\\Montreal\Projets\Mtl\60597613_Mine_Strange_Lake_SLWO_GIS\Livrables\09_Impact\Detail\Project\Description\

4 Summary of the Results of Engagement Activities with Indigenous Groups

4.1 Information and Consultation Activities Carried Out

4.1.1 List of Consultation Activities Carried Out for the Northern Components of the Project

Torngat Metals (previously Quest Rare Minerals) initiated informal meetings with Indigenous representatives from Nunavik and Labrador as early as 2008. Beginning in 2011, a series of more formal meetings was organized with key Indigenous communities, including follow-up meetings following changes in authorities. Between 2015 and 2021, due to a decrease in its corporate activities, engagement activities with stakeholders were reduced by keeping them informed of updates on the project.

Since 2022, Torngat Metals has restarted its formal consultation activities with the various governments and Indigenous groups. Meetings have been held with elected representatives, leaders and officials as well as the population of many Indigenous communities. The list of the engagement activities held with the Indigenous communities is presented in Appendix B.

Since Spring 2023, stakeholders and partners have access to a web platform providing project maps, database and reports, which ease the information disclosure in a transparent way.

The consulted Indigenous groups are as follows:

In Quebec

- The Nunavik Inuit, including the Makivvik Corporation, the Kativik Regional Government, as well as the northern village and landholding corporation of Kangiqsualujjuaq.
- The Naskapi Nation of Kawawachikamach.
- The Quebec Innu of Matimekush-Lac John and Ushat mak Mani-Utenam.

In Labrador

- The Nunatsiavut Inuit, including representatives of the Nunatsiavut Government legislative assembly, the Nunatsiavut Group of Companies, and the community of Nain, and various officials.
- The Labrador Innu, including the Innu Nation of Labrador political representative, as well as the communities of Sheshatshiu and Natuashish, and various officials.

The consultation activities that have been carried out since 2011 have, among other things, made it possible to collect essential information for the impact study, particularly regarding the historical and contemporary use of the territories affected by the project, as well as the socio-economic conditions of the communities. These activities have also made it possible to identify their expectations and concerns related to the project, the overall concerns expressed by most communities being: the preservation of the water quality of the George River and its tributaries; the protection of caribou and valued species that are part of the diet of the populations; economic benefits that promote sustainable development of the communities concerned; access to relevant information related to the Project; and effective participation of communities in the development of the project.

In addition to the various activities held separately with the different Indigenous groups, Torngat Metals organized a visit to the Lac Brisson camp and the proposed mine site in September 2023. This visit enabled several Indigenous representatives (Inuit, Innu and Naskapi) to see the exploration facilities at first hand and to talk with Torngat Metals representatives on site.

Main results of the engagement activities with the Nunavik Inuit in 2023-2024

The consultation process conducted with the Inuit of Nunavik includes three major entities: the community of Kangiqsualujjuaq, Makivvik Corporation and the Kativik Regional Government. Since the beginning of 2023, several information and consultation activities have taken place with these entities, particularly with the community of Kangiqsualujjuaq. Torngat Metals has visited this community 4 times since 2023. Meetings were held with the town council, the landholding corporation and the local population. Other activities were also held online, notably to organize the visits and to present the project update.

Overall, the activities carried out with the Inuit of Nunavik revealed the importance of land and resources in the Inuit way of life and diet. As a result, they expressed concern about the project's impact on the environment, particularly on river water quality, fish species and caribou. Of particular concern are water and dust management, and the presence of radionuclides in the extracted material.

In response to these concerns, the authorities of Kangiqsualujjuaq and Torngat Metals have set up a liaison committee whose activities will keep the population informed of the project's next steps and discuss the environmental, social and economic issues raised by the community. The committee is made up of representatives from the village, LHC and community groups (women, youth, elders).

Main results of the engagement activities with the Naskapi of Kawawachikamach in 2023-2024

The Naskapis of Kawawachikamach and Torngat Metals have maintained an ongoing dialogue since the beginning of 2023. The chief and advisors of the Naskapi Nation shared the expectations and concerns of the nation in relation to the project, and first and foremost that of the potential impacts on the George River caribou. From the first meetings with the Naskapi leadership, it was agreed by both parties to set up a Caribou Working Group in order to share any relevant information on the company's activities that could have impacts on the herd as well as on the measures potential to be applied in order to avoid these impacts, particularly during the critical calving period.

More specifically, the purpose of the Caribou Working Group meetings is to review the methodology of the different field work happening on the territory together and to put in place mechanisms to avoid impacting the herd of George river caribous during those activities. Torngat Metals put in place an interactive map of all incidental observation of caribous by the field workers on a shared web platform. The link to the map and a PDF version is sent to all the communities in Quebec and Labrador once to several times a week, as soon as the field workers observe the presence of caribous. For the 2024 summer exploration campaign, the Caribou Working Group is currently working to develop and to implement a caribou protection program based on previous measures put in place in 2023.

The Naskapi Nation has also expressed a strong interest in participating in the development of the project, particularly in the development and implementation of the environmental monitoring program, and in providing expertise, services and manpower for subsequent exploration, construction and operation. The Naskapi Nation and Torngat Metals are currently discussing the terms of a future pre-development agreement to establish the parameters of the collaboration between the two parties. Eventually, Torngat Metals would like to include other indigenous partners in this type of agreement.

Main results of the engagement activities with the Innu of Matimekush Lac-John and Uashat mak Mani-Utenam in 2023-2024

Dialogue activities with the Innu of Matimekush Lac-John and Uashat mak Mani-Utenam are in the preliminary stages. A single meeting was held with the Chief of Matimekush Lac-John in 2023 to present the project and hear his expectations and concerns for further dialogue activities. Torngat Metals has subsequently made several proposals to the Innu leadership to meet again, but these attempts have so far been unsuccessful.

As for the Innu of Uashat mak Mani-Utenam, a number of preliminary meetings were held, notably with leadership during the site selection phase for the rare earth separation plant, and then with the Economic Development Corporation and the Bureau de protection du territoire de Uashat mak Mani-Utenam.

These meetings enabled Innu stakeholders to express their expectations and concerns regarding the project, particularly with regard to the protection of caribou, the environmental risks associated with the presence of radionuclides in the extracted material, and the importance of properly consulting the Innu throughout the project development process.

Main results of the engagement activities with the Nunatsiavut Inuit in 2023-2024

A number of dialogue activities with the Inuit of Nunatsiavut were carried out at various levels, whether governmental, village authorities or the general population. Meetings with Nunatsiavut government representatives provided an opportunity to discuss several topics and issues raised by the construction of a future access road and port facility. Among them were concerns about the social acceptability of the project within the communities, due to the opening up of the territory. Discussions also took place on the requirements of Nunatsiavut's environmental assessment process, as well as on the studies to be carried out, such as the land use study. With regard to the latter, the Nunatsiavut Government and Torngat Metals are working to establish a framework for collaboration that will enable the study to be carried out with the full participation of the Inuit.

Meetings were also held in Nain and Hopedale (2 of the 5 Nunatsiavut Inuit communities affected by the project) with local authorities and the general public. Torngat Metals expect to visit the three other communities before summer 2024. The main concerns of the Inuit refer to the potential significant impacts of the construction and operation of the access road on the environment and the Inuit way of life. In particular, impacts on the Ikadlivik River and on fish populations (Char) are feared. Impacts on the George River caribou herd raise also concerns among the population. In response to Inuit concerns about the location of the proposed road in the Ikadlivik River valley, Torngat Metals has studied a new road option that avoids the valley.

Discussions also took place with officials and the general public on the economic impact of the project. Several people expressed scepticism about the significance of the spin-offs in terms of contracts and jobs. In particular, they feared that most of the benefits would go to Quebec, and that Nunatsiavut would only reap the negative impacts (environmental and social). The Inuit suggest that Torngat Metals provide more precise information on the economic impacts of the project in the future.

Main results of the engagement activities with the Labrador Innu in 2023-2024

Dialogue with Innu Nation is at a preliminary stage, and neither of Labrador's two Innu communities (Natuashish and Sheshatshiu) has yet been visited by Torngat Metals. In 2023 and 2024, a few meetings with Innu Nation leadership enabled Torngat Metals to provide updated information on the project, as well as to gather the Innu's initial questions, concerns and expectations about the project. Community visits in Natuashish and Sheshatshiu are scheduled in the first half of 2024.

Like other indigenous groups, the Labrador Innu are particularly concerned about the impacts of the proposed mine and road on caribou, waterways and fish populations. The Innu also fear that the proposed road will open up the territory to other users, which could have a negative impact on the Innu way of life.

The Innu also expect Torngat Metals to carry out a robust consultation process, reaching out to various population groups, including elders, men, women and young people. They also expect to participate actively in the study, impact assessment and environmental monitoring process to be carried out by Torngat Metals.

Innu Nation's leadership was also keen to express its expectations in terms of economic spin-offs, specifying that the Innu have developed business capabilities and the skills of the Innu workforce that can be put to good use in the development of the project.

Table 4-1 provides a summary of the consultation activities conducted with Indigenous groups to date, as well as their main issues and concerns discussed.

Table 4-1: Indigenous groups consulted since 2011 in Quebec and Labrador and main issues and concerns discussed

Indigenous group	Date	Indigenous entity	Issue / concern discussed
Nunavik Inuit (Quebec) Baseline studies on socio-economic aspects and traditional land use, information meetings and community engagement process, environmental assessment process	2012 – 2015	– Makivvik Corporation – Nunavik Mining Exploration Fund (NMEF) – Kativik Regional Government (KRG) – Municipal authorities of Kuujjuaq and Kangiqsualujjuaq – Landholding Corporations of Kuujjuaq and Kangiqsualujjuaq – KRG Sustainable Employment Service – Representatives from the Employment Sector of the Northern Communities of Kangiqsualujjuaq – Regional and local development service of KRG – School principals in Kuujjuaq and Kangiqsualujjuaq – Representatives from Health Centres in Kuujjuaq and Kangiqsualujjuaq	– Expectations in terms of business opportunities for registered Inuit businesses – Concerns regarding the environmental protection, notably the water quality and fishes of the George River – Concerns on the protection of the Inuit diet and way of life – Expectations on potential Impact and Benefits Agreement (IBA) – Expectations on training and job opportunities
Nunavik Inuit (Quebec) Baseline studies on socio-economic aspects and traditional land use, information meetings and community engagement process, environmental assessment process	2023 (ongoing)	– Municipal authorities of Kuujjuaq and Kangiqsualujjuaq – Landholding Corporations of Kuujjuaq and Kangiqsualujjuaq – Community meetings with elders and land users in Kangiqsualujjuaq – Nunavik Research Center	– Expectations in terms of business opportunities for registered Inuit businesses – Concerns regarding the environmental protection, notably the water quality and fishes of the George River – Concerns on the protection of the Inuit diet and way of life – Concerns about the water and dust management. – Concerns regarding the radioactivity level and the potential contamination of the environment – Expectations on potential Impact and Benefits Agreement (IBA) – Expectations on training and job opportunities – Expectations regarding the Inuit participation in the decision making and the environmental monitoring of the project – Expectations on potential Impact and Benefits Agreement (IBA)
Naskapi Nation of Kawawachikamach Baseline studies on socio-economic aspects and traditional land use, information meetings and community engagement process	2011 – 2015	– Leaders of the Naskapi Nation of Kawawachikamach – Elders, land users and community members of Kawawachikamach (through a public meeting) – Public Works Department – Naskapi Nation Bureau – Naskapi Development Corporation – Naskapi Police Services	– Expectations in terms of job and business opportunities – Concerns regarding the environmental protection, notably the caribou – Expectations on potential Impact and Benefits Agreement (IBA)

Table 4-1: Indigenous groups consulted since 2011 in Quebec and Labrador and main issues and concerns discussed (Cont'd)

Indigenous group	Date	Indigenous entity	Issue / concern discussed
Naskapi Nation of Kawawachikamach Baseline studies on socio-economic aspects and traditional land use, information meetings and community engagement process	2023 (ongoing)	– Leaders of the Naskapi Nation of Kawawachikamach – Elders, land users and community members of Kawawachikamach (through a public meeting)	– Expectations in terms of job and business opportunities – Concerns regarding the environmental protection, notably the caribou – Expectations on recognition of Naskapi interests in Labrador – Expectations on potential pre-development agreement (PDA) and Impact and Benefits Agreement (IBA) – Expectation to realize their own environmental studies – Expectations regarding the Naskapi participation in the decision making and the environmental monitoring of the project – Expectations about economic benefits and Naskapi financial participation to the project
Québec Innu Information meetings and community engagement process	2012 – 2015	– Matimekush-Lac John First Nation Council – Aventures Ashini – Friends of Mushuau-Nipi	– Expectations on recognition of Innu rights and interests in the project's area – Concerns about the mining practices in the region over the past decades
Québec Innu Information meetings and community engagement process	2023 (ongoing)	– Matimekush-Lac John First Nation Council	– Expectations on recognition of Innu rights and interests in the project's area – Concerns about the mining practices in the region over the past decades – Expectations to build a strong partnership in terms of equity – Concerns about the radioactivity in the extracted material and the potential impact of the separation plant on the environment – Expectations for a robust consultation and social acceptability of the project.
Nunatsiavut Inuit (Labrador) Baseline studies on socio-economic aspects and traditional land use, information meetings and community engagement process, environmental assessment process	2011 – 2015	– Nunatsiavut government leaders and ministers – Nunatsiavut Secretariat – Nunatsiavut Department of Land and Natural Resources – Nunatsiavut Department of Education and Economic Development – Nunatsiavut Department of Health and Social Development – Nunatsiavut Department of Culture and Tourism – Nunatsiavut Affairs Department – Representatives from the Inuit community government of Nain – Community meetings with elders and members of the Inuit community of Nunatsiavut in Nain	– Realization of their own land use study in collaboration with the project – Concerns regarding the impacts on the Ikadlivik brook valley and its resources, notably the char – Concerns regarding the impacts of the projected road on the caribou – Expectations on business opportunities for the Inuit enterprises – Expectations on potential Impact and Benefits Agreement (IBA) – The Voisey's agreement to be seen as a model

Table 4-1: Indigenous groups consulted since 2011 in Quebec and Labrador and main issues and concerns discussed (Cont'd)

Indigenous group	Date	Indigenous entity	Issue / concern discussed
Nunatsiavut Inuit Introduction of revised plans (since Quest); environmental assessment process and expectations; updated information on traditional land use; engagement process; port options in Voisey's Bay; sensitivities to char and caribou; opportunities for business, employment and public markets	2023 (ongoing)	– President, Ministers of Education and Economic Development; Language, Culture and Tourism; and Lands and Natural Resources, – Deputy Ministers and officials of Nunatsiavut Secretariat; Education and Economic Development; Language, Culture and Tourism; Lands and Natural Resources, – Nunatsiavut Group of Companies	– Expectation to update their land use study – Expectations for a consultation of the 5 Inuit communities – Concerns regarding the impacts on the Ikadlivik brook valley and its resources, notably the char – Concerns regarding the impacts of the projected road on the traditional way of life – Concerns about the open-up of the territory – Concerns regarding the impacts of the projected road on the caribou – Expectations on business opportunities for the Inuit enterprises – Expectations on potential Impact and Benefits Agreement (IBA) – The Voisey's agreement to be seen as a model – Concerns about the level of radioactivity and the environment contamination – Interest to take charge of the proposed road maintenance
Innu Nation of Labrador Baseline studies on socio-economic aspects and traditional land use, information meetings and community engagement process	2012 – 2015	– Leaders of the Innu Nation of Labrador – Innu Development Limited Partnership (IDLP) – Innu Mikun – Mushuau Innu Band Council of Natuashish and Sheshatshiu Innu Band Council – Environment office of Innu Nation – Economic Development Advisors for the Mushuau and Sheshatshiu Innu First Nations – Sheshatshiu Innu First Nation's Community Health Department – Community meetings with land users and other members of the Natuashish and Sheshatshiu communities	– Expectations to be a partner in the construction and the maintenance of the proposed road – Expectations of business opportunities for Innu companies – Concerns on the potential impacts of the proposed road on caribou – Expectations on recognition of Innu interests in Quebec – Expectations on potential Impact and Benefits Agreement (IBA)
Innu Nation of Labrador Plans for the Voisey's Bay port; road design; overlap of Indigenous land claims; business, supply and employment opportunities for Labrador Innu; expectations for business participation; consultation plans for Innu communities	2023 (ongoing)	– Grand Chief of the Innu Nation of Labrador – IBA negotiators – Environmental Management and Analysis Branch of the Environment department – Land Rights Negotiator – Key Advisors	– Expectations of business opportunities for Innu companies and workforce. – Concerns on the potential impacts of the proposed road on caribou, water and fish populations. – Expectations on potential Impact and Benefits Agreement (IBA) – Concerns about the open-up of the territory

4.1.2 List of Consultation Activities with Indigenous Groups Carried out in Sept-Îles Area

Preliminary contacts with the Uashat mak Mani-Utenam Innu representatives were made for the separation plant in Sept-Îles, during a site visit in July 2023. Torngat Metals also met twice (in 2023 and 2024) with the Société de Développement Économique de Uashat Mak Mani-utenam (SDEUM) to present the Strange Lake Project. The SDEUM expressed Interest in understanding all the potential project benefits for the development of the separation plant. The SDEUM also raised the importance for Torngat Metals to conduct information and consultation activities with the Innu Leadership and the population.

The representative of the Innu Land Protection Office and the legal advisor for the community of Uashat mak Mani-Utenam met twice (2023 and 2024) to present the separation plant project and to gather their expectations and concerns. The Innu have indicated that they need more information about the presence of radioactivity in the material and the main associated impacts. They also stressed the importance of opening a dialogue with the leadership of Uashat mak Mani-Utenam and ensuring that information and consultation activities are held with the Innu population.

4.2 Planned Information and Consultation Activities with Indigenous Groups During the Conduct of the Environmental and Social Impact Study

As part of the environmental and social impact study, Torngat Metals plans to conduct new information and consultation activities with the Indigenous authorities and communities affected by the project.

Without limitation, Torngat Metals plans to carry out the following activities:

- Consultation activities to obtain basic data for conducting studies on the physical, biological, and social environment, land use as well as closure vision.
- A consultation program that combines various techniques: village assemblies, interviews with target groups (territorial users, elders, youth, men, women), individual interviews with key stakeholders within communities (local administration services).
- A program of periodic visits to Indigenous communities concerned to inform them of project updates and opportunities.
- Diffusion of a set of information tools culturally adapted, in Indigenous language, developed in collaboration with the Indigenous groups.
- Establishment and collaboration with local monitoring committees and local liaison officers (communities still to be determined) on the main issues raised by the project.
- Establishment of consultation and grievance mechanisms allowing members of communities to express their questions and views online.
- Translation services will be provided at public meetings, as well as document translation to provide access to information to all.

All results of these consultation activities will be recorded in the stakeholder management system developed by Torngat Metals as part of the project.

The following table presents a preliminary program to conduct consultation activities with the concerned Indigenous communities in Quebec and Labrador during the ESIA process.

Table 4-2: Preliminary consultation program with the concerned Indigenous communities in Quebec and Labrador

Activity	Period	Group/Representative	Activity Type	Topic
Fall 2023 preconsultation meetings	Q4 2023	Indigenous leadership and institutions: – Makivvik – Inuit of Kangiqsualujjuaq and Kuujuaq (villages and LHC) – Nunavik research center – KRG – Naskapi Nation of Kawawachikamach – Innu council of Matimekush Lac-John – Innu Takuaikan Uashat mak Mani-Utenam – Nunatsiavut Government – Innu Nation	Face to face meeting with Indigenous leadership and administration	– Update on Strange Lake Project – Environmental and social impact assessment process – Indigenous participation in the social studies – Community consultation and liaison committee implementation – Torngat Metals procurement and training policies – Preliminary discussion on future agreements (PDA, funding of the local liaison committee, Indigenous participation in the preparation of the social studies)
Preparation of the ESIA consultation	Q1 and Q2 2024	Indigenous leadership and institutions: – Makivvik – Inuit of Kangiqsualujjuaq and Kuujuaq (villages and LHC) – Nunavik research center – KRG: Indigenous hunting, fishing and trapping support program, sustainable employment, regional and local development – Naskapi Nation of Kawawachikamach – Innu council of Matimekush Lac-John – Innu Takuaikan Uashat mak Mani-Utenam – Nunatsiavut Government: Education and economic development, Health and social development, Lands and Natural Resources. – Nunatsiavut villages authorities: Nain, Makkovik, Hopedale, Postville and Rigolet – Innu Nation – Environment office of Innu Nation – Natuashish and Sheshatshiu Councils	Face to face meetings	– Review of the Project Descriptions submitted to the Ministry of the Environment – Discussion on the consultation methodology

Table 4-2: Preliminary consultation program with the concerned Indigenous communities in Quebec and Labrador (Cont'd)

Activity	Period	Group/Representative	Activity Type	Topic
Realization of the ESIA consultation	Q2, Q3 and Q4 2024	Indigenous population: – Kangiqsualujjuaq – Kawawachikamach – Matimekush-Lac John – Uashat mak Mani-Utenam – Nain, Makkovik, Hopedale, Postville and Rigolet – Natuashish – Sheshatshiu	Community meetings	– Presentation of the consultation methodology – Update on the project – Indigenous expectations and concerns about the project
		Representatives, civil servants and other key informants of the above Indigenous communities	Individual face-to-face meetings	– Data collection to prepare the land use and the socio-economic studies: contemporary occupancy and land use; demographic and socio-economic profile (housing, education, health, employment, etc.) – Indigenous expectations and concerns about the project
		Specific groups (elders, youth, women, men and GBA Plus groups) of the above Indigenous communities	Focus groups	– Interview with specific groups of the community to have their point of view regarding the living conditions and quality of life within the community and to understand their aspirations and challenges – Indigenous expectations and concerns about the project
		Indigenous population: – Kangiqsualujjuaq – Kawawachikamach – Matimekush-Lac John – Uashat mak Mani-Utenam – Nain, Makkovik, Hopedale, Postville and Rigolet – Natuashish – Sheshatshiu	Household survey	– Socio-economic data collection on the Indigenous households – Indigenous expectations and concerns about the project

4.3 Answers to Summary of Issues

Following the publication of the Initial Project Description (IPD) in September 2023 and the engagement and consultation activities conducted by the Impact Assessment Agency of Canada (IAAC), a Summary of Issues was published on the Canadian Impact Assessment Registry on December 23, 2023 (English version) and January 23, 2024 (French version). As already mentioned in section 3.3, the description of how Torngat Metals intends to address each of the issues raised, including those from Indigenous Communities, is presented in the document "Answers to Summary of Issues" available in Appendix A of the Detailed Project Description (DPD).

5 Previous Studies and Programs

5.1 Historical Studies Between 1967 and 2019

The Newfoundland and Labrador, Quebec and Federal governments conducted numerous geological surveys between 1967 and 2009. The first studies in this area were carried out by the Geological Survey of Canada (GSC) in 1967. These studies made it possible to establish a geological map of the Strange Lake and the George River area at a scale of 1 :250 000.

Between the 1970s and 1980s, the *Ministère de l'Énergie et des Ressources* (MER) of Quebec carried out detailed mapping of the George River area, located northwest of the property as well as geochemical sampling of stream (Beaumier, 1982).

In 1979 and 1980, the GSC and the Newfoundland and Labrador Department of Natural Resources jointly completed geochemical sampling of lake sediment, water and radiometric surveys. This survey has resulted in the identification of the strong geochemical dispersion pattern of the Strange Lake complex and exhibiting a significant mineralization in this area.

During the 1980s, the Iron Ore Company of Canada (IOCC) and a few private companies have carried out detailed geological mapping, geochemical sampling, radiometric surveys and hundreds of drill holes. This survey has made it possible to identify more accurately the Strange Lake alkaline complex and its mineralization: rare earth elements, zirconium, beryllium, niobium and yttrium.

The 1980s and 1990s also saw metallurgical testing and economic studies of the mineral potential of the Strange Lake area. This work was carried out by private companies including IOCC (Witteck Development Inc., 1982, IOCC,1985), Mitsui Mining and Smelting Co. (1996), as well as several other private companies. Other extensive geological surveys have also been conducted by government authorities (GSC, Newfoundland and Labrador).

In the 2000s, field exploration activities were focused on uranium mineralization. In 2006, Freewest Resources Canada Inc. acquired 23 mining claims for uranium exploration (Chamois, P. and Cook, B., 2007). The exploration program was subsequently transferred to its newly formed subsidiary, Quest Uranium Corporation, in 2007. In the same year, as a result of a share trade, Freewest transferred all of the Georges River mining claims to Quest Uranium Corporation. The Strange Lake rare earths mineralized area is partially included in, or adjacent to, the transferred claims.

From this moment, the company had focused its efforts on the development of this rare earth deposit and its name is changed to Quest Rare Minerals Ltd. In 2009, Quest Rare Minerals Ltd. acquired a block of claims from Quebec prospectors to consolidate its property. From 2009 to 2012, Quest conducted an extensive exploration program, including detailed mapping and extensive drilling of the Strange Lake Alkaline Complex mineralized zones, particularly the area identified as the B-Zone, adjacent to Lac Brisson and located in Quebec.

Several mineral resource estimate reports as well as preliminary economic assessments (PEA) have been published, along with the field work. In 2010, Wardrop published a Technical Report on the mineral resource estimate on the Strange Lake B-Zone deposit (updated 2011) as well as a PEA (Wardrop, 2010 a., 2010 b, 2011).

In 2012, Micon (Micon, 2012) prepared a new estimate of the mineral resources of the deposit and published a pre-feasibiliy study (PFS) in December 2013 followed by a Preliminary PEA in 2014. This report was successively updated in 2014, 2017 and 2019 (Micon 2014, 2017, 2019). In the 2019 report, Micon presented a new interpretation of the deposit geological model, by Renaud Geological Consulting, also a signatory of the 2019 Micon report.

In parallel to these activities, and until 2017, Quest conducted several metallurgical, beneficiation and preliminary separation test work. In July 2018, Quest changed its name to Torngat Metals Ltd. (Torngat Metals).

5.2 Environmental and Baseline Studies Completed by AECOM

Several baseline studies were completed between 2011 and 2014 for the Strange Lake Project on behalf of Torngat Metals Ltd. (formerly Quest Rare Minerals LTD). The Table 5-1 presents the available reports. Those reports will either be updated with more recent data, or their validity will be re-confirmed.

Table 5-1: Reports completed between 2012 and 2014 as part of the PFS (Dec 2013) and PEA (Nov 2014)

Report Title	Project Component	Report Title	Project Component
Geochemistry Baseline	Mine Site	Surficial Geology, Geomorphology and Permafrost (Mine, Road and Port)	Northern Components
HHERA - Human Health and Ecological Risk Assessment	General	2013 Groundwater and Soil Technical Report - Mine	Mine Site
Landscape (Quebec & Labrador)	Northern Components	Surface Water Quantity (Hydrology)	Mine Site
Local Services Analysis	Northern Components	Government and Community Relations – Preliminary Communication and Engagement Plan	Northern Components
Mine and Port Site Potable Water Resources	Mine Site	Government and Community Relations – Stakeholder Mapping and Analysis - Mine Site, Road Corridor and Port Site	Northern Components
Asbestiform Amphibole Analysis (CO-16)	General	Government and Community Relations – Housing Infrastructure and temporary Accommodation Analysis - Mine Site, Road Corridor and Port Site	Northern Components
Weather - Environment Baseline Climate	Northern Components	Government and Community Relations – Local Services Analysis - Mine Site, Road Corridor and Port Site	Northern Components
Workforce and Recrutement Analysis	Northern Components	Government and Community Relations – Workforce and Recruitment Analysis – Mine Site, Road Corridor and Port Site	Northern Components
Consideration of Sustainable Development in the Strange Lake B-zone REE Project (with a Sustainability Matrix)	General	Government and Community Relations – Preliminary Strategic Plan for Training of Aboriginal Workforce – Mine Site, Road Corridor and Port Site	Northern Components
2013 Nighttime Illumination – Technical Memorandum	General	Social Baseline Studies - *Land Use and Traditional Ecological Knowledge (TEK) – Mine Site, Road Corridor and Port Site*	Northern Components
Secular equilibrium and radioactive decay	General	Social Baseline Studies - *Archeological Inventory – Mine Site*, Strange Lake B-Zone	Mine Site
Consideration of Climate Change Adaptation in the Strange Lake B-Zone REE Project	General	Social Baseline Studies - *Socio-Economic Profile, Northern Communities*	Northern Components
Mine Site Hydrogeology - Ground Water and Soil Investigation 2011-2012	Mine Site	Social Baseline Studies - *Landscape – Mine Site*, Strange Lake B-Zone	Mine Site
Ambient Air Quality, 2011	Mine Site	Social Baseline Studies - *Landscape – Road Corridor and Port Site*	Access Road
Background Noise Study, 2011	Mine Site	Semi-aquatic and Terrestrial Wildlife 2011-2013 -Biological Environment Baseline Surveys - **Amended Version**	Northern Components
Fluvial Geomorphology	Access Road	Social Baseline Studies - *Archeological Inventory – Road Corridor and Port Site* - **Amended Version**	Access Road

6 Applicable Strategic Assessments

The project is in line with the publication of the *Canadian Strategy on Critical Minerals* (Natural Resources Canada, 2022), as well as the *Quebec Plan for the Valorization of Critical and Strategic Minerals* (Government of Quebec, 2020). The Strange Lake Project is one of the rare earth deposits recognized as having global potential. See Section 7 *Project Rationale and Purpose* for more details.

6.1 Strategic Assessment Under the IAA

Under the Impact Assessment Act (IAA), as per article:

95 (1) The Minister may establish a committee — or authorize the Agency — to conduct an assessment of

- *(a) any Government of Canada policy, plan or program — proposed or existing — that is relevant to conducting impact assessments; or*
- *(b) any issue that is relevant to conducting impact assessments of designated projects or of a class of designated projects; and*

95 (2) The Minister may deem any assessment that provides guidance on how Canada's commitments in respect of climate change should be considered in impact assessments and that is prepared by a federal authority and commenced before the day on which this Act comes into force to be an assessment conducted under this section.

As part of best practices during the impact assessment of designated projects, ECCC developed the *Strategic Assessment of Climate Change* (SACC) (Revised October 2020; Government Canada, 2022) to protect the environment and communities, advance reconciliation with Indigenous people, while contributing to Canada's commitment to climate change. Strange Lake Rare Earth Mining Project will comply with SACC given as Torngat Metals is guided by IESG standards and aims to be recognized as a socially and environmentally responsible supplier of rare earths for the electric mobility, renewable energy, and other low-carbon footprint markets. Section 23 of the current document details the *Strategic Climate Change Assessment* including the greenhouse gas emissions (GHG), mitigation measures, net-zero plan, limitations and resilience to climate change.

It is noteworthy that at the submission of the DPD, a *Statement on the Interim Administration of the Impact Assessment Act pending legislative amendments* was in place. [4]

6.2 Strategic Environmental Assessment

In Newfoundland and Labrador, Strategic environmental assessment (SEA) represents a broad-based approach to environmental assessment that examines the environmental effects on larger ecological setting, rather than a project or site-specific issues. According to the website (CNLOPB, 2023), no SEA is currently assessed.

Finally, we are not aware of any ongoing strategic environmental assessment in Nunatsiavut.

[4] Statement on the Interim Administration of the Impact Assessment Act pending legislative amendments: Government of Canada. 2024 [Online]: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/statement-interim-administration-impact-assessment-act-pending-legislative-amendments.html (Page consulted on March 27 2024)

PART C – PROJECT INFORMATION

7 Project Rationale and Purpose

The purpose of the project is to produce rare earth oxides (REO) to sale into supply chains in Canada, U.S., Europe, Japan and South Korea, primarily into the rare earth permanent magnet supply chain.

The Strange Lake Alkaline Complex (SLAC) has been known for many years as a world-class rare earth deposit in both quantity and quality. The timing for the Strange Lake Rare Earth Mining Project now is ideal. Firstly, responsibly produced rare earths are urgently needed as part of the solution for climate change. Secondly, the timing is ideal since all the components for a responsible plan to bring the Strange Lake Project into production are ready and in place. In partnership with Indigenous communities, the plan is to implement innovations with world-leading technical and engineering partners, to maximize social, environmental and financial benefits, while reducing any negative impacts and risks.

The products that will be produced are separated REO. The focus is specifically on the rare earth oxides needed for high performance permanent magnets, namely the light rare earth oxides (LREO) neodymium (Nd), praseodymium (Pr), and the heavy rare earth oxides (HREO) dysprosium (Dy), and terbium (Tb). The Strange Lake Project is particularly important in providing a new supply Dy and Tb. Currently, China supplies almost all of global Dy and Tb needs. The Strange Lake Project once in operation, is expected to be the largest global Dy and Tb supplier outside of China. The other 11 rare earths also have important value in their applications, however many of them are oversupplied. Torngat Metals will refine other valuable rare earths based on market conditions and production costs.

The rationale for the development of rare earth mining and refining in production is clearly described in the *Canadian Critical Minerals Strategy* (Natural Resources Canada, 2022):

> **Honourable Jonathan Wilkinson, Minister of Natural Resources**
>
> *"*Critical minerals are the building blocks for the green and digital economy. There is no energy transition without critical minerals: no batteries, no electric cars, no wind turbines and no solar panels. The sun provides raw energy, but electricity flows through copper. Wind turbines need manganese, platinum and rare earth magnets. Nuclear power requires uranium. Electric vehicles require batteries made with lithium, cobalt and nickel and magnets. Indium and tellurium are integral to solar panel manufacturing."

Among the 31 critical minerals identified in the Strategy on page 9, rare earth elements are one of the six prioritized minerals (Figure 7-1). The strategy articulates the growing needs for critical minerals including rare earth elements.

> **Foundations for a Competitive, Sustainable Economy**
>
> *"Critical minerals are the building blocks for the green and digital economy. They are used in a wide range of essential products, from mobile phones to solar panels, electric vehicle batteries to medical and healthcare devices, to military and national defence applications. Without critical minerals, there can be no green energy transition for Canada and the world. By investing in critical minerals today, we are building a sustainable industrial base to support emission-reducing supply chains that will address climate change for generations to come (e.g., net-zero energy and transportation systems). Growth in green and digital applications is expected to boost the global demand for many critical minerals. According to the International Energy Agency, the energy sector's overall needs for critical minerals could increase by as much as six times by 2040. The North American zero-emission vehicle (ZEV) market alone is estimated to reach $174 billion by 2030, creating more than 220,000 jobs in mining, processing, and manufacturing."*

The Strategy also compares the 31 critical minerals on Canada's list to the lists of other jurisdictions (Table 7-1). Rare earth elements are the only one to be on everyone's list of critical minerals.

Table 7-1 : Comparing Canada's Critical Mineral List (from Annex E of the Canadian Critical Minerals Strategy, Natural Resources Canada, 2022)

Critial minerals	Jurisdictions							
Rare earth elements group	Canada (2021)	EU (2020)	USA (2022)	Japan (2019)	Australia (2022)	South Africa (2022)	India (2016)	UK (2021)
	X	X	X	X	X	X	X	X

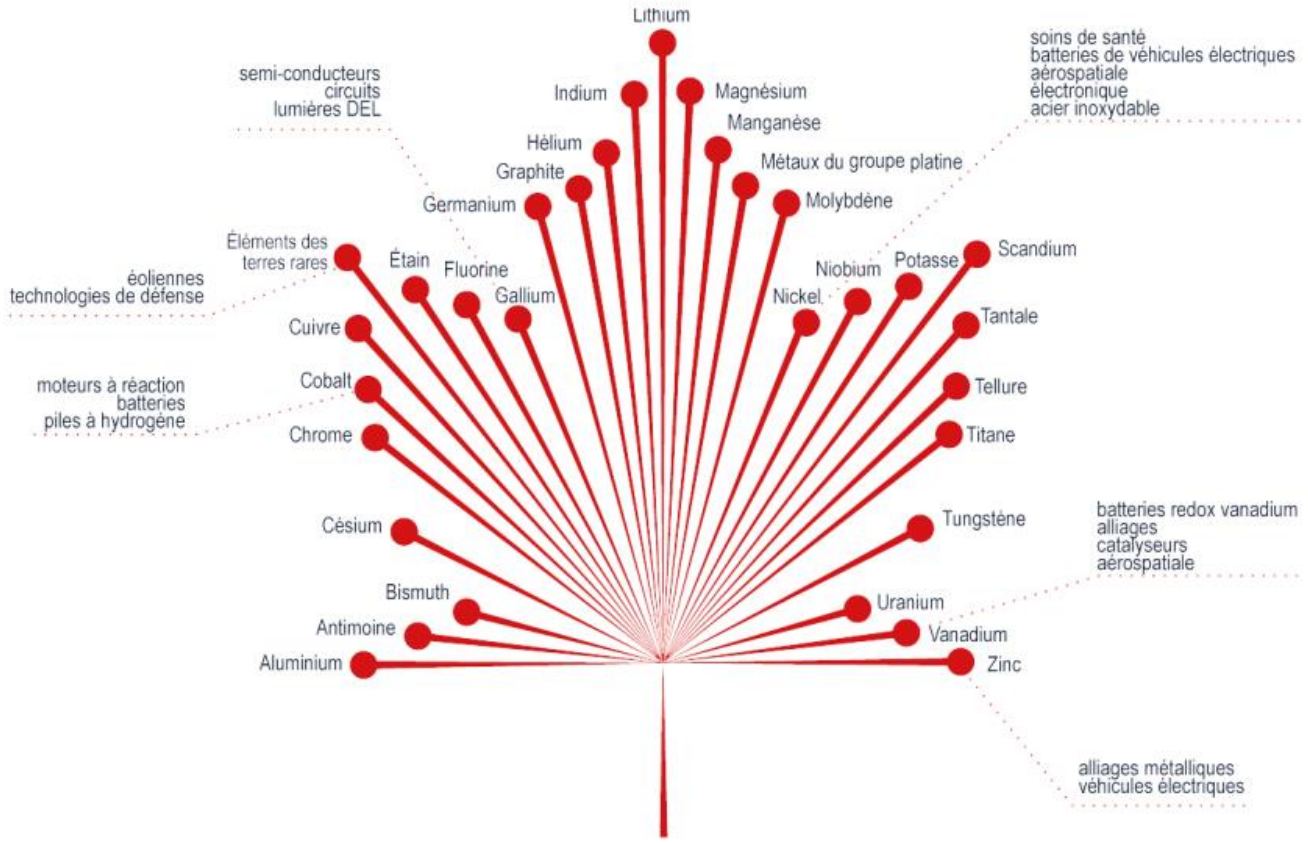


Figure 7-1 : Canada's critical Minerals and Dome of their Uses (from The Canadian Critical Minerals Strategy, p.9, Natural Resources Canada, 2022)

The rationale and approach for development of rare earth projects are also explained in the *Quebec Plan for the Development of Critical and Strategic Minerals* (Gouvernement du Québec, 2020).

> ***"Why do we need to be interested in CSMs?***
>
> *Minerals such as graphite, lithium, cobalt, nickel and the rare earth elements are among the materials indispensable to the green energy transition. They are necessary for the production of electric vehicles and renewable energy (wind turbines, solar panels) that allow us to achieve our objectives in GHG reduction and the fight against climate change.*

Work According to Our Values

This is also a question of values and principles: we have the power, in our own territory, to govern CSMs development while respecting the local and Indigenous populations, ensure workers' health and safety and protect the environment. In short, to do things correctly, according to our priorities! Our high social and environmental standards and our guidance tools for businesses on social acceptability favour the development of winning projects for all.

Reduce Our Environmental Footprint

Given that these minerals are not renewable, we must think about strategies for optimum use of the available resources, particularly by betting on recirculation of extracted material. The circular economy, at the core of the Plan, depends on ecodesign, recycling and reuse of mineral resources.

This future-oriented approach will allow us to reduce our environmental footprint and satisfy the demand for CSMs."

The Government of Newfoundland and Labrador released *Our Critical Minerals Advantage, A Plan to Maximize the Value of Newfoundland and Labrador's Critical Minerals Resources* in November 2023 (Government of Newfoundland and Labrador, 2023), it is consistent and aligned with both Canadian and Quebec Governments' strategies (Natural Resources Canada, 2022; Gouvernement du Québec, 2020) as released in December 2022 - *Support for Critical Mineral Exploration in Newfoundland and Labrador - News Releases (gov.nl.ca)* (Government of Newfoundland and Labrador, 2022).

Honourable Andrew Parsons, Minister of Industry, Energy and Technology

"*Critical minerals are an essential component of many renewable energy and clean technology applications, and are vital to building the province's green and digital economy. Our government was committed to developing a provincial Critical Minerals Plan that is inclusive and reflective of the needs of our people and communities, while establishing policy frameworks that will attract investments to develop our resource potential."*

The US Department of Energy has recently published a report titled "Critical Materials Assessment (USDOE, July 2023), in which the four rare earth elements targeted by the Strange Lake Project are highlighted as critical in both short term or mid term (see Figure 7-2AB).

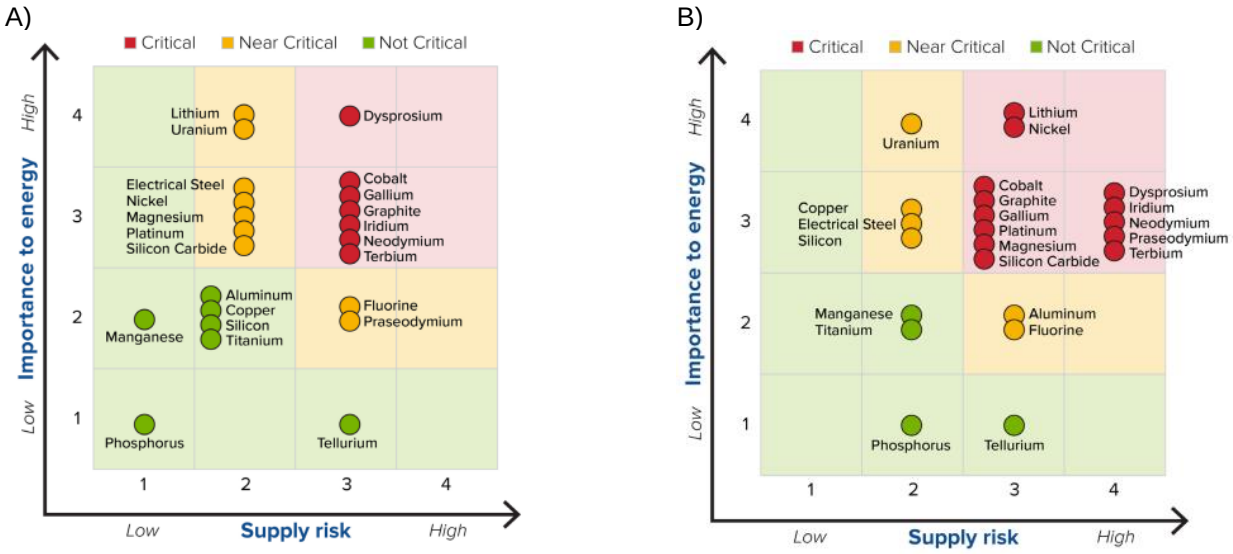


Figure 7-2 : A) Short-term (2020-2025) and B) Long-term (2025-2035 criticality matrix for key materials (from USDOE, 2023)

7.1 Rare Earth Elements Market

There are 15 rare earth elements (Table 7-2), plus 2 additional elements that are included due to their similar properties (yttrium and scandium). Rare earth are metallic elements that are not rare per se, but rare to be found in economically attractive deposits. In deposits, they are always found together, but in proportions unique to each deposit. They have valuable properties that make them essential in many applications. In fact, they are ubiquitous across may common products– everyone interacts with rare earth elements everyday.

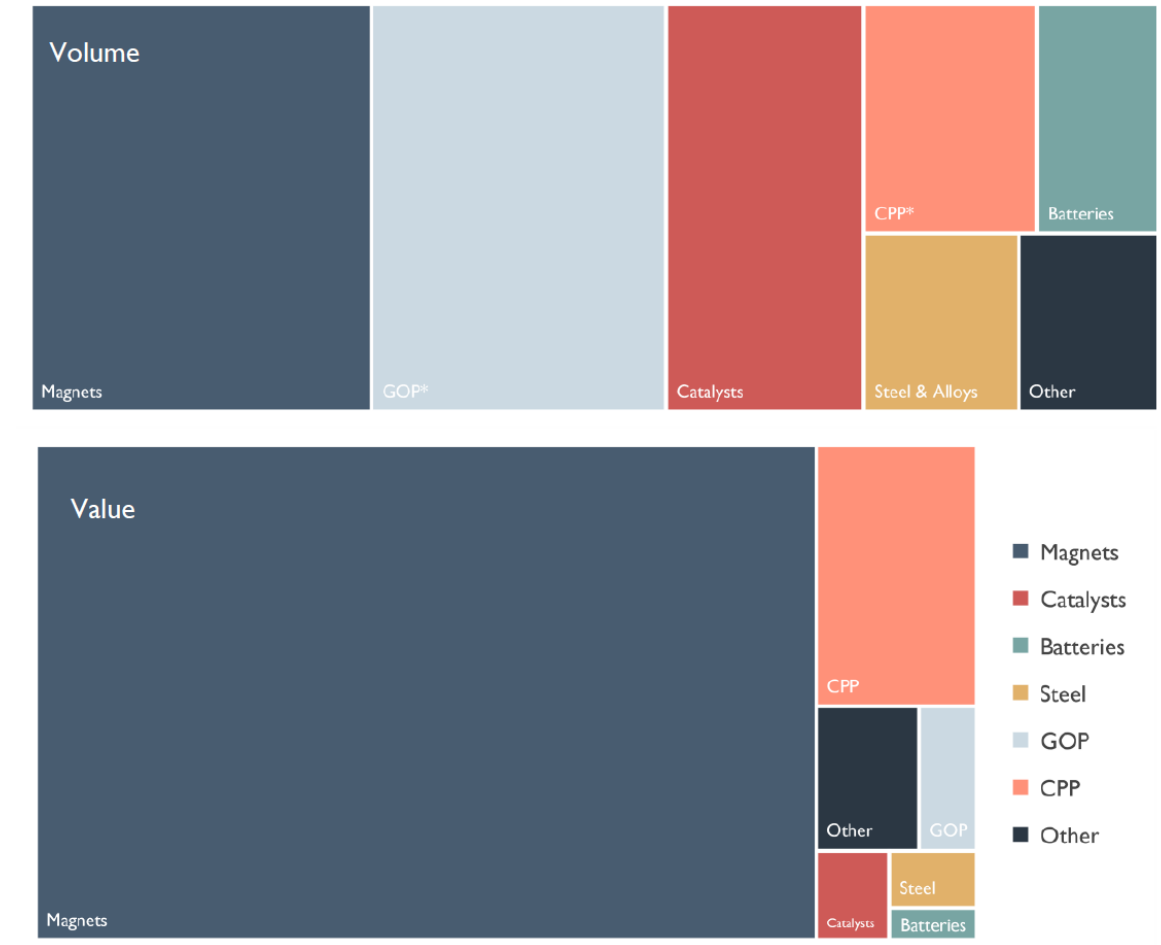
Table 7-2 : Applications and example end uses in daily life of rare earth elements (REE) (from Project Blue, 2022)

Critical minerals	Applications	Example end uses	Critical minerals	Applications	Example end uses
La	NiMH batteries, phosphors, catalysts, alloying, ceramics	Smart phones, gasoline	**Tb**	Phosphors, lighting, X- rays, magnets	Electric vehicles, smart phones, wind turbines
Ce	Polishing powder, optical glass, pigments, ceramics, catalysts, mixed metal	Screens, gasoline	**Dy**	NdFeB magnets, ceramics, lasers, nuclear fuel, phosphors, ceramics	Electric vehicles, smart phones, wind turbines
Pr	Glass and ceramics, CAT scans, magnets	Electric vehicles, smart phones, wind turbines	**Ho**	Lasers, medical and dental tech, pigments	Medical equipment
Nd	NdFeB magnet, optical and lasers		**Er**	Ceramics, pigments, optics, lasers	Screens, smartphones
Pm	Radiation source, FCC catalysts	Petroleum products	**Tm**	Lasers, x- rays, ceramics	Medical equipment
Sm	SmCo magnet, electric motors	High temperature motors	**Yb**	Fibre optics and lasers, radiation for x-rays	Telecommunications, medical equipment
Eu	Computer and TV displays, medical tech, lasers, fluorescent lighting	Smart phones, vehicles	**Lu**	X-ray phosphors, baggage scanners, oil exploration	Medical equipment
Gd	MRI, CT and X- rays	Medical equipment, screens, smartphones			

Each rare earth element is essential in their specific application. Some rare earths are used in high volumes compared to others. However, they are not supplied in nature in same proportion as their demand. This results in an oversupply of some rare earth elements and an undersupply of others, particularly since the demand for each rare earth is also unique to each application. The rare earth elements used in permanent magnets are the most important for economic viability of a rare earth project.

Figure 7-3 illustrates a graphic from Project Blue[5]. It highlights that the volume of rare earth elements used for permanent magnets is similar to a few other applications like glass polishing and catalysts. However, by value, the rare earth elements used for permanent magnets represent over 80% of the value of the rare earth element market.

[5] Project Blue is an organization providing market intelligence on energy transition supply chains and the critical materials which underpin them (https://projectblue.com/)



Source: *Project Blue*
Notes: *GOP- glass, optics & polishing*
CPP- ceramics, phosphors & pigments

Figure 7-3 : Rare Earth Demand by Volume and Value in 2022 (Project Blue)

Project Blue's long-term outlook for rare earth demand is for permanent magnets to be the key area of growth for the industry, which is forecast to account for over 47% of demand by volume by 2050. Nd will grow at a CAGR of 3.7%, however, HREEs critical in EV drivetrain magnets will see stronger relative CAGRs of 4.3% for Tb and 5.8% for Dy. Therefore, Project Blue projects that prices for the four permanent magnet rare earths will increase by 50-85% between 2023 and 2033.

Since permanent magnets are the most important application driving the economic attractiveness of developing a rare earth project, it is important to understand what they are.

Rare earth permanent magnets are everywhere and critical to each application:

- Electric vehicle drivetrain motors for passenger cars, trucks, buses
- Dozens of motors in all types of vehicles (power steering, windows, seats, etc.)
- Drones, planes
- Wind turbines
- Defense industry

- Industrial robots
- Industrial equipment (e.g. pumps)
- Air conditioners
- Elevators
- Appliances
- Medical imaging equipment
- Smartphones
- Headphones and speakers
- Hard drives (computers and servers)
- Sensors
- Consumer goods (jewellery, toys, etc.)
- And others.

Of particular importance are the permanent magnets that are essential for high efficiency motors used in electric vehicles, drones, robotics and increasingly in wind turbine generators. Electric vehicles (EVs) require a high-performance battery to store energy and a high-performance drive train motor to use the energy to move the vehicle. The battery system is unavoidably larger and more expensive than the drive train motor. This means that motor efficiency, enabled by permanent magnets, is critical because a less efficient motor requires a larger battery, which adds significant cost and weight.

The type of permanent magnet used in EVs contains the rare earths neodymium, praseodymium, dysprosium and in some cases terbium. The light rare earths—neodymium and praseodymium— are the key magnetic elements for producing a permanent magnet. Less understood though is the critical role that heavy rare earths—dysprosium and terbium—play in high performance applications such as a drivetrain motor. Heavy rare earths create a stronger magnet and allow the magnet to retain its magnetic properties in elevated temperatures during motor operation. (More technically, dysprosium and terbium increase the energy density of the magnet and improve the thermal stability, resulting in increased power, size efficiency and long-term reliability.) Dysprosium and terbium do not occur in significant quantities in most rare earth deposits, causing serious challenges matching supply to demand. Despite higher prices, dysprosium and terbium continue to be a cost-effective drive train motor solution considering the combined cost of the battery and motor system.

Over the past decade, there have been significant advances in permanent magnet technology to deploy dysprosium and terbium more efficiently. This has allowed the tight supply of dysprosium and terbium to be stretched over an ever-increasing number of EVs and other applications, but the need for heavy rare earths is continuously growing.

With the rapid acceleration of the production of EVs, dysprosium and terbium have risen to the top of the criticality list because they work so much better than any other options. However, due to the risks and uncertainty of supply security, there have been efforts to remove dysprosium and terbium entirely, or even to move to non-permanent magnet motors. These alternatives inevitably come with compromises to efficiency, performance, reliability, and costs. This means that companies and countries who can establish a long-term supply security for these two heavy rare earth elements will have a distinct and significant competitive advantage.

China controls almost 100% of the dysprosium and terbium supply. China’s dysprosium and terbium supply comes from their domestic mining and up to 50% comes from ore concentrate from Myanmar (which is a heavily sanctioned country in a civil war), since China doesn’t have enough Dy and Tb to meet its own internal demand. China is also increasingly importing concentrate from other countries. The only project that could produce a significant quantity of Dy and Tb, but less than Strange Lake, is Northern Minerals in Australia, and that project has significant challenges and has Chinese ownership.

Despite progress underway on other aspects of the supply chain, such as developing new magnet manufacturing facilities in North America, production will remain dependent on China unless secure dysprosium and terbium supply can be increased to support the rapidly growing demand for high efficiency permanent magnet motors.

Due to the urgent need to close the supply gap of all rare earths, and critically the heavy rare earths, rare earth projects that have high quantities of dysprosium and terbium, are economically attractive, meet ESG criteria, and have social license, should be considered for development. Meeting climate change and decarbonization targets requires manufacturing of products that use critical minerals sourced from a responsible, traceable, fully independent and diverse supply chain.

7.2 The Role of the Strange Lake Rare Earth Mining Project in the Permanent Magnet Supply Chain

Unlike most other rare earth projects, the Strange Lake deposit contains the full suite of critical light— neodymium and praseodymium, and heavy rare earths—dysprosium and terbium needed for permanent magnets. Most projects lack mineable quantities of these two heavy rare earths.

The permanent magnet supply chain starts from high purity separated rare earth oxides, conversion to their metal form, production of magnet alloys, production of magnets and finally assembly into finished electric motors. Strange Lake Project includes mine to finished high-purity separated rare earth oxides entirely in Canada. Strange Lake products will go customers in US, Europe, Japan, South Korea and Canada, either directly or downstream customers, e.g. in Quebec today, Dana TM4 assembles magnets into motors that go into buses built by Lion Electric; in future Dana TM4 could buy its magnets from VAC's plant being built in the U.S., using REO from Strange Lake. Torngat Metals will not send any rare earth concentrates or semi-finished product to China.

With regards to magnet demand, the demand from the U.S. defense industry is very small compared to the overall magnet industry (<1%).

Torngat Metals is in active discussions with potential customers and supply chain partners who need to secure their rare earth needs and who value responsible and traceable suppliers. The company is in discussions with magnet manufacturers in the U.S., Europe and Japan, with wind turbine manufacturers in the U.S and Europe and with automotive OEMs in the U.S., Europe and Japan. Torngat Metals is committed to ensuring that the traceability of its supply and distribution chains can be verified with complete transparency.

7.2.1 Project Economics

Strange Lake is focused on producing the four critical magnet market rare earths, Pr, Nd, Dy, Tb. These magnets are essential in technologies to fight climate change. More than 90% of Torngat Metals revenue will be from these 4 climate-critical rare earths.

Torngat Metals will produce other rare earth oxide products depending on market demand, e.g. it may produce some Lu, which is essential for manufacturing PET medical imaging equipment.

It is important to the rationale for the Strange Lake Project that the project must be economically attractive. On the revenue side, it is clear that the market demand is strong and growing over the short, medium and long-term, resulting in strong pricing forecasts. On the cost side, the project fundamentals are to continually strive for lowering cost by increasing efficiency. The project is on track to achieve the goal of being cost competitive compared to other existing and future suppliers, while always leading in environmental and social performance. Cerberus Capital Management confirmed the project met their financial attractiveness and ESG criteria through their comprehensive full year of due diligence in 2021 to 2022.

8 Applicable Provisions

8.1 Physical Activities

Under the schedule to the *Physical Activities Regulations* (SOR/2019-285; amended SOR/2021-25 & SOR/2023-60), the following physical activities will be undertaken by Torngat Metals under Sections 18, 46 and 52: The construction, operation, decommissioning and abandonment of one of the following:

- 18 (d) a new metal mill, other than a uranium mill, with an ore input capacity of 5 000 t/day or more;
- 18 (e) a new rare earth element mine with an ore production capacity of 2 500 t/day or more;
- 46 (a) a new aerodrome with a runway length of 1,000 m or more
- 52 The construction, operation, decommissioning and abandonment of a new marine terminal designed to handle ships larger than 25 000 DWT.

Specifically, the project is composed of the following physical activities:

- New Strange Lake rare earth mine with a maximum production capacity of initially 36,000 t/day (QC).
- New concentration plant with a maximum capacity of 17,000 tonnes of concentrate per day (QC).
- New aerodrome with a 1,500 m runway (QC).
- New single lane access road (seasonal and private) between the mine site and port facilities for shipping concentrate to the Sept-Îles separation plant. Two road alignment options or variants are being studied:
  - Option A: the access road leads to the existing port of Vale's nickel-copper mine in Edwards Cove, Anaktalak Bay on the east coast of Labrador, NL. This option includes the construction and operation of a new container storage and handling facility near existing port facilities. Other additional infrastructure to be built and operated at the new storage and handling facility include: one maintenance workshop, one worker camp including a canteen and medical area, and fuel tanks that will be refuelled from tanker vessel through a rigid pipeline.
  - Option C: the access road leads to Voisey's Bay on the east coast of Labrador, NL. This option includes the construction and operation of a floating dock with a possible capacity to serve ships of more than 25,000 DWT, and a new container storage and handling facilities. Other additional infrastructure to be built and operated at the new port facilities include: one maintenance workshop, one worker camp including a canteen and medical area, and fuel tanks that will be refuelled from tanker vessel through a rigid pipeline. The
- Port facilities (see options A and C above) for shipping concentrate to the Sept-Îles separation plant. By barge and self geared container ships to the existing port of Sept-Îles (QC)..
- New rare earth separation plant with a capacity of 1,000 t/day, in an existing industrial port area in Sept-Îles, Quebec.

Section 9 details the project description and outlines the other activities related to Strange Lake Project that will be under the responsibility of third-party companies.

As it stands, the current project is not a component of a larger project. Under Section 7(1) of the IAAC, subject to subsection (3), the proposed project elements may cause:

(a) a change the following components of the environment that are within the legislative authority of Parliament:

(i) *fish* and *fish habitat*, as defined in subsection 2(1) of the *Fisheries Act*,

(ii) *aquatic species*, as defined in subsection 2(1) of the *Species at Risk Act*,

(iii) *migratory birds*, as defined in subsection 2(1) of the *Migratory Birds Convention Act*, 1994, and

(iv) any other component of the environment that is set out in Schedule 3;

(b) a change to the environment that would occur:

(i) in a province other than the one in which the act or thing is done, or

(c) with respect to the Indigenous peoples of Canada, an impact — occurring in Canada and resulting from any change to the environment — on

(i) physical and cultural heritage,

(ii) the current use of lands and resources for traditional purposes, or

(iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;

(d) any change occurring in Canada to the health, social or economic conditions of the Indigenous peoples of Canada; or

(e) any change to a health, social or economic matter within the legislative authority of Parliament that is set out in Schedule 3.

The *Fisheries Act* prohibits the deposit of deleterious substances into waters frequented by fish, unless the deposit is authorized by regulations. The *Metal and Diamond Mining Effluent Regulations* (MDMER) are regulations made pursuant to subsections 34(2), 36(5) and 38(9) of the *Fisheries Act*. These regulations apply to metal and diamond mines, milling facilities and to hydrometallurgical facilities that have a flow rate of at least 50 m³/day from all mine effluent discharge points. Environment and Climate Change Canada (ECCC) is responsible for the implementation and enforcement of Section 36 (3) of the *Fisheries Act* and the MDMER. The MDMER contain provisions to allow for the disposal of mine waste in waters frequented by fish under certain conditions.

It is noteworthy that the project involves the construction of infrastructures such as the mine pit and a residue stockpile area (Section 9.2.1; Map 9-1) that may disrupt drainage and modify fish habitat. For any project where the proposed disposal of mine waste would affect waters frequented by fish, an amendment to Schedule 2 of the MDMER would be required. Nevertheless, at this DPD stage, disposal of mine waste (tailing impoundment area) is not planned in fish habitat. Torngat Metals is considering not disrupting drainage nor FAFH for mine waste disposal and rather works on best management practices (BMPs) promoting alternatives for mine waste management that would exclude impacts on the aquatic environment. The assessment of alternatives on mine waste management and for demonstrating the preferred option is completed using the criteria set out in the *Guidelines for the assessment of alternatives for mine waste disposal,* while defining the best options based on environmental, technical, economic and socio-economic criteria. Should such a scenario arise, appropriate consultation and studies will be undertaken. The MDMER also requires the development and implementation of a fish habitat compensation plan (FHCP) that meets all the requirements under Section 27.1 of the Regulations to offset the loss of fish habitat that would occur as a result of the use of a water body for mine waste disposal.

In addition to respecting the Canadian laws and regulations, the Strange Lake Project will ensure that it respects those of Newfoundland and Labrador, Quebec and the Nunatsiavut government (Section 18) as well as international standards in terms of environmental, social and governance (ESG) issues. Finally, its environmental follow-up/monitoring and restoration programs will be developed in such a way as to aim for carbon neutrality by 2050, all with a view to sustainable development.

9 Project Description

9.1 Brief Description of the Project

The Strange Lake Rare Earth Mining Project is divided into three project phases: 1) Development and construction phase; 2) Operational exploitation phase (30-year operation); and 3) Closure and restoration phase.

During the 30-year operation phase, approximately 195 million tonnes of mining material will be extracted from an open pit, and between 2.25 to 6.0 million tonnes per year of crushed material will be fed to the onsite concentration plant. Between 150,000 to 200,000 tonnes per year of rare earth concentrate will then be produced by on-site concentration plant with a processing capacity of 17,000 tonnes of crushed material per day. The concentrate will be transported by a new road from the mine site to a port located on the eastern coast of Labrador. At this stage of the project's development, there are two roads and port options. One would be for the road to join the Vale's Port in Edwards Cove **(**Anaktalak Bay), so as to make use of these existing port facilities. The other is to reach the head of Voisey's Bay (NL) where a new port facility with a floating dock would be built. The concentrate will then be shipped to a rare earth separation plant to be built in an existing industrial port area in Sept-Îles, Quebec. The concentrate will be fed to the separation plant at a maximum rate of 1,000 tonnes per day, which will produce between 2,800 and 3,200 tonnes per year of rare earth oxides (REO) (and 12,000 – 17,000 tonnes per year of balance of rare earth product concentrates).

Throughout the document, maps and figures are available to facilitate the location and understanding of the project as well as its planned infrastructure. For Section 9 *Project Description,* these are:

- Overall project Map (Map 9-1)
- Project components in the North (Map 9-2)
- Mine layout options (Map 9-3 to 9-7)
- Projet components in Sept-Îles (Map 9-8)

Map 9-1 illustrates the overall project and related activities for a better understanding of the project logistics.

Map 9-2 illustrates the project components in the North, based on one of the variants being studied for the infrastructures at the mine site and the two road alignment options to the eastern coast of Labrador. For the separation plant, project components in Sept-Îles are illustrated on Map 9-8.

Project variants are summarized in Section 12.

9.2 Project Components at the Mine Site

The following sections provide a brief description of the major components of the project at the mine site.

The Strange Lake alkaline complex occupies a total area of 3,600 ha, whereas Lake Brisson occupies a total surface area of 3,200 ha. Lake Brisson flows into Napeu Kainut Lake, and then into the Déat River. The primary hydrographic basin is that of the George River, which is located about 100 km downstream of the mine site considering the water flow (the George River is approximately 30 km due West of the mine site).

There are different options for developing the mine and related infrastructure. A schematic illustration of the mine site layout preferred Option (A) is shown in Maps 9-3 to 9-5, at four different periods of its life. Map 9-4 shows an approximate layout of the facilities after approximately 5 years of operation: the pit excavation is in progress and all facilities are in place. Map 9-5 shows what the site looks like after approximately 20 years of operation, when the pit excavation is completed, and the low-grade piles are at their maximum capacity.

Maps 9-6 and 9-7 are schematic illustrations of other Options (B and C) at year 20 of operation. These different Options A, B and C will be evaluated and compared as part of the pre-feasibility and feasibility studies, as well as during the impact assessment, in order to select the one that will minimize potential impacts and enhance acceptability, while meeting operational needs.

9.2.1 Mine Pit, Mining Plan and Geochemical Characterization Program

The project's mineral resources are contained in a single deposit identified as the B-Zone. The current mining plan developed over a 30-year period is to mine as much material as possible in the first 20 years, in order to first process the material containing a higher concentration of the desired elements (high-grade ore), and to stockpile the lower-grade material for further processing in the remaining 12 years. The design of the mine pit takes into account a minimum distance without activities to ensure the protection of the Lake Brisson water.

Given the proximity of the deposit to the surface, the mine is designed to be operated as a standard open pit using trucks and mechanical shovels. The following options were considered for the design of the mining pit:

- Pit for maximum exploitation of the resource: this pit design option aims to exploit all the most rare-earth-concentrated zones of the deposit, regardless of the constraints associated with the presence of the lake (not illustrated). This option was rejected because it would have required work in the lake with significant environmental impacts.
- Economic Pit RF 1.0 Granite: this pit design allows for maximum exploitation of the resource while maintaining a minimum distance of 30 m from the high-water level of Brisson Lake (see Figure 9-1). This option was not selected because of the non-optimal stripping ratio and the larger quantities of waste rock to be stockpiled.
- Economic Pit RF 1.0: like Economic Pit RF 1.0 Granite option above, this pit design maintains a minimum distance of 30 m from the high-water level of Brisson Lake[6], but it also targets the resource more optimally and minimizes waste rock by limiting mining to the most concentrated areas (see Figure 9-1). This option was chosen for the project.

Table 9-1 : Current mining plan

Period	Year 1-6 (cumulative)	Year 6-20 (cumulative)	Year 21-30 (cumulative)	Total over 30 years (Mine life)
Total Mined (t)	30,400,000	164,900,000	0	195,300,000
Overburden (t)	7,000,000	4,700,000	0	11,700,000
Waste (t)	10,000	290,000	0	300,000
Mineralised Material (t)	23,400,000	160,000,000	0	183,400,000
Mill Feed (Concentration Plant) (t)	11,250,000	42,000,000	60,000,000	113,250,000

A geochemical characterization program (Appendix D) has been developed for Strange Lake to identify materials (i.e., waste rock, resource stockpiles, overburden, residues, etc.) that may result in potential acid rock drainage or metal leaching (ARD / ML). These will inform engineering designs on what needs to be implemented to ensure contact water is mitigated, reduce discharges to the receiving environment and ensure minimal effects on the receiving environment. In addition, a sampling program performed by the Saskatchewan Research Council (SRC) will include testing of radionuclides on each source or waste material based on recommended guidelines. It is important to note that the geochemical testing program includes toxicity testing.

[6] The high-water mark will be confirmed during 2024 field surveys as part of the baseline studies.

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



\\na.aecomnet.com\Canada\Montreal\DCS\Projets\ENV\60697132_Mines_Strange_Lake_SLI\60_CAD_SIG\Livrables\09_produit\DetailedProjectDescription\

Composante du projet / Project Component

- Site potentiel des installations portuaires / Potential site for Port Facilities
- Mine et usine de concentration (Lac Brisson) / Mine and Concentration Plant (Lac Brisson)
- Site potentiel de l'usine de séparation des terres rares (Sept-îles) / Potential Site of the Rare Earth Separation Plant (Sept-Iles)
- Route maritime projetée / Potential Shipping Route

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Autre / Other

- Frontière provinciale / Province Boundary

0 100 200 km

North America Lambert Conformal Conic

Source:
Données topographiques / Topographic Data: NRCan, (2022)

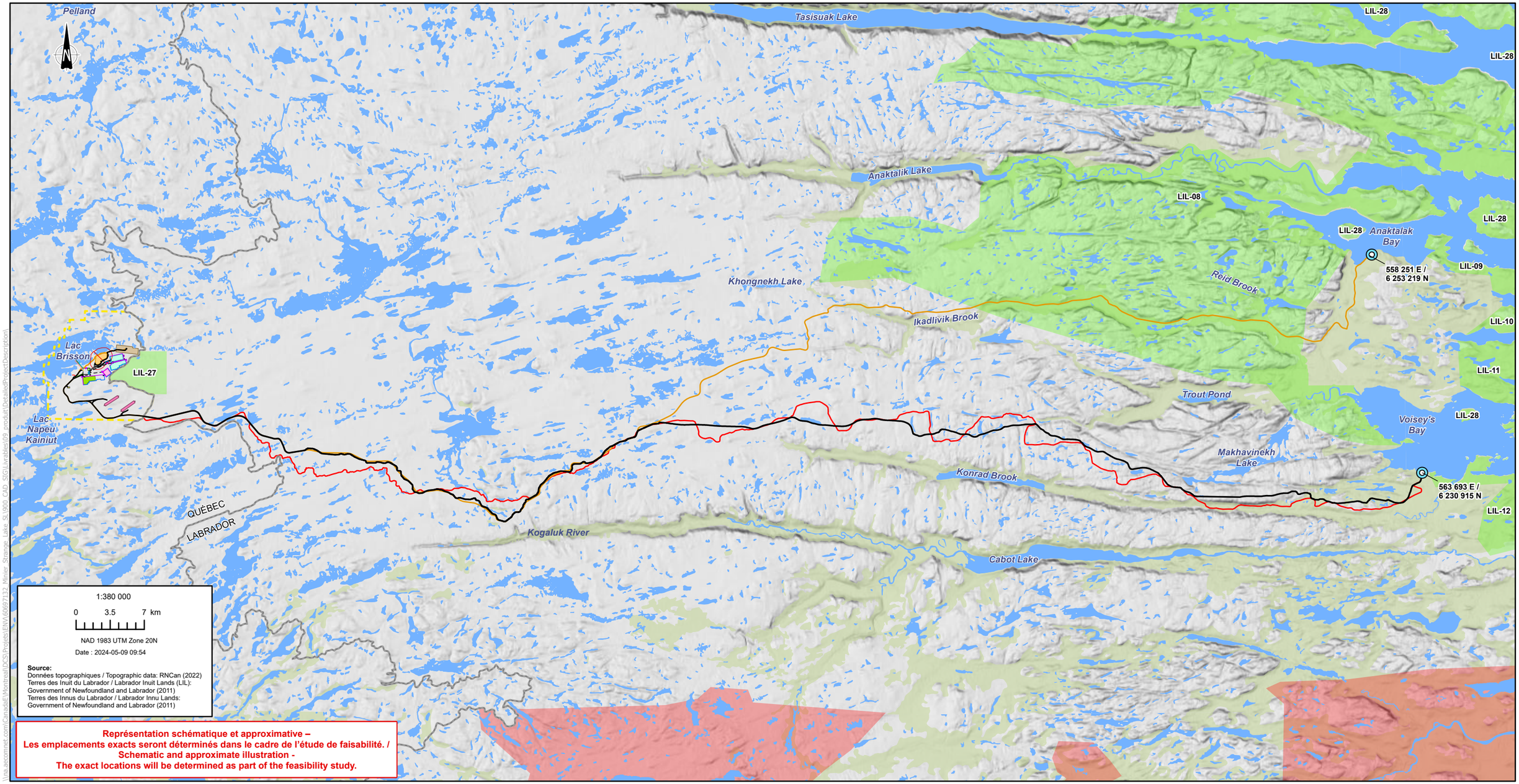
Carte 9-1
Carte globale du projet

Map 9-1
Overall Project Map

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



\\ca.aecomnet.com\Corp\QE\Montreal\CS\Projects\ENV\60697122 Miner_Strange Lake_SLG\00_CAD_SIG\Livrables\03_produit\DetailedProjectDescription\

Composante du projet / Project Component

- Limite de propriété / Property limit
- Site potentiel des installations portuaires / Potential site for Port Facilities
- Canalisation souterraine / Underground pipeline
- Convoyeur / Conveyor
- Point de rejet alternatif des eaux usées minières traitées / Alternative discharge point for treated contact and process wastewater
- Fossé d'eaux usées minières / Contact water ditch
- Fossé d'eaux de ruissellement du bassin versant / Non-contact water ditch
- Prise d'eau / Water intake piping
- Routes de service et de halage / Service and hauling roads)
- Tunnel d'accès / Access tunnel
- Émissaire des eaux usées minières traitées / Treated contact and process wastewater outlet
- Émissaire des eaux usées domestiques traitées / Treated domestic wastewater outlet
- Aire d'accumulation des résidus miniers / Mine residue stockpile area
- Aire d'entreposage de mort-terrain / Overburden stockpile
- Banc d'emprunt / Borrow pit
- Bassin de collecte d'eaux usées minières / Contact water collection pond
- Camp permanent des travailleurs / Permanent worker camp
- Halde de stérile / Waste rock
- Fabrication et stockage d'explosif / Explosive manufacturing and storage facilities
- Fosse minière / Mine pit
- Ressource à basse teneur / Low-grade stockpile
- Piste d'atterrissage potentielle / Potential airstrip
- Stockage de carburant / Fuel tank farm
- Site d'enfouissement / Landfill site
- Zone industrielle / Industrial area
- Usine de traitement des eaux / Effluent treatment plant
- Bassins d'entreposage des eaux / Water storage ponds

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Autre / Other

- Frontière Québec et Labrador / Quebec and Labrador border
- Terres des Inuit du Labrador / Labrador Inuit Lands (LIL)

Terres des Innus du Labrador / Labrador Innu Land

- Catégorie I / Category I

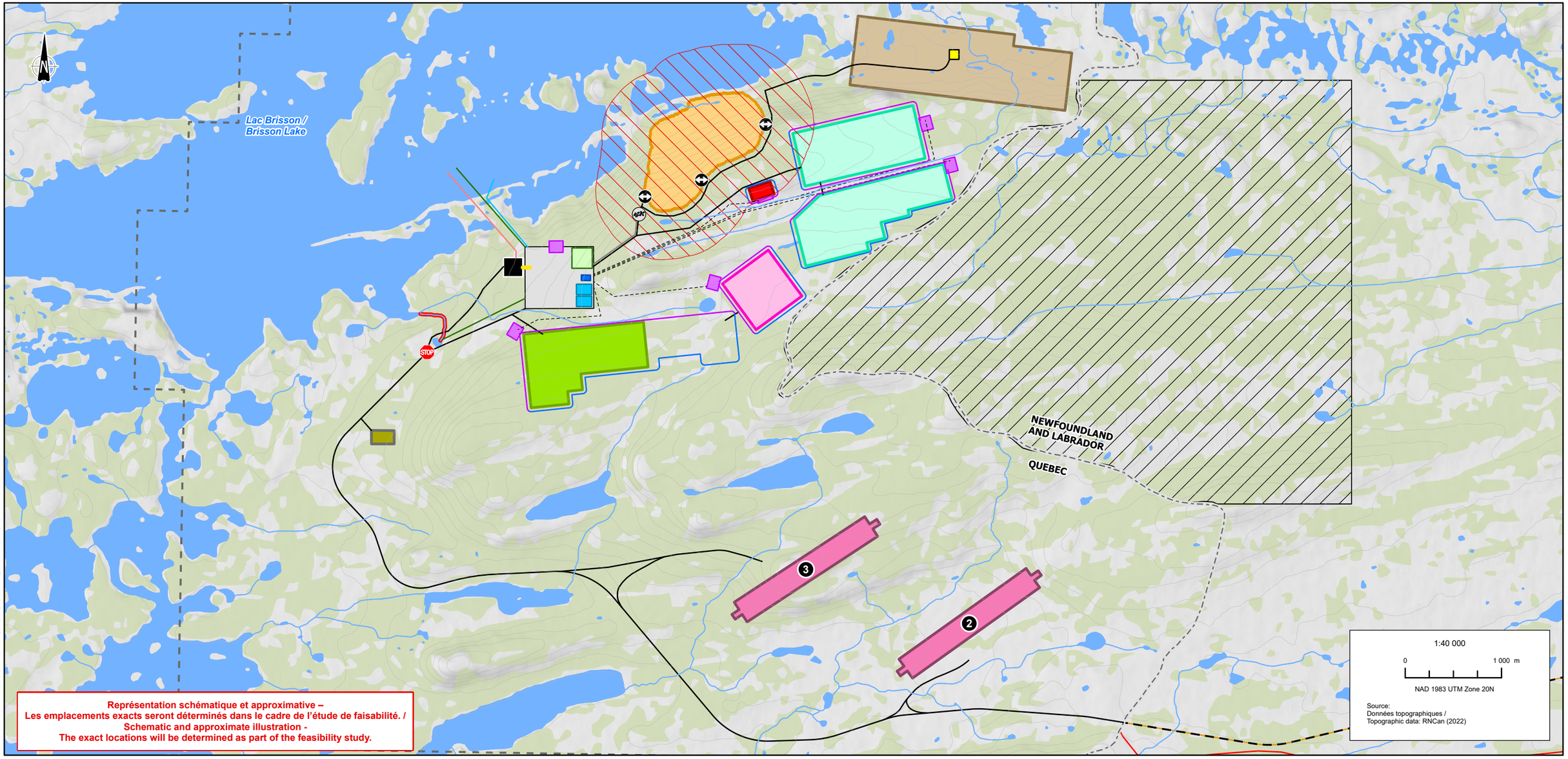
Carte 9-2
Composantes du projet au Nord

Map 9-2
Project Components in the North

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Représentation schématique et approximative –
Les emplacements exacts seront déterminés dans le cadre de l'étude de faisabilité. /
Schematic and approximate illustration -
The exact locations will be determined as part of the feasibility study.

Composante de la mine / Mine Component

- Limite de propriété / Property limit
- Porte d'accès / Access gate
- Sortie de la fosse / Pit exit
- Station de concassage / Crushing Station
- Canalisation souterraine / Underground pipeline
- Convoyeur / Conveyor
- Point de rejet alternatif des eaux usées minières traitées / Alternative discharge point for treated contact and process wastewater
- Fossé d'eaux usées minières / Contact water ditch
- Fossé d'eaux de ruissellement du bassin versant / Non-contact water ditch
- Prise d'eau / Water intake piping
- Routes de service et de halage / Service and hauling roads
- Tunnel d'accès / Access tunnel
- Émissaire des eaux usées minières traitées / Treated contact and process wastewater outlet
- Émissaire des eaux usées domestiques traitées / Treated domestic wastewater outlet
- Aire d'accumulation des résidus miniers / Mine residue stockpile area
- Aire d'entreposage de mort-terrain / Overburden stockpile
- Banc d'emprunt / Borrow pit
- Bassin de collecte d'eaux usées minières / Contact water collection pond
- Camp permanent des travailleurs / Permanent worker camp
- Halde de stérile / Waste rock
- Fabrication et stockage d'explosif / Explosive manufacturing and storage facilities
- Fosse minière / Mine pit
- Ressource à basse teneur / Low-grade stockpile
- Piste d'atterrissage potentielle / Potential airstrip
- Stockage de carburant / Fuel tank farm
- Site d'enfouissement / Landfill site
- Zone industrielle / Industrial area
- Usine de traitement des eaux / Effluent treatment plant
- Bassins d'entreposage des eaux / Water storage ponds
- Zone de souffle d'explosion / Blast zone

Route d'accès à une voie / Single Lane Access Road

- Option A
- Option C1
- Option C2

Autre / Other

- Frontière / Border
- Terres des Inuits du Labrador / Labrador Inuit Lands (LIL)

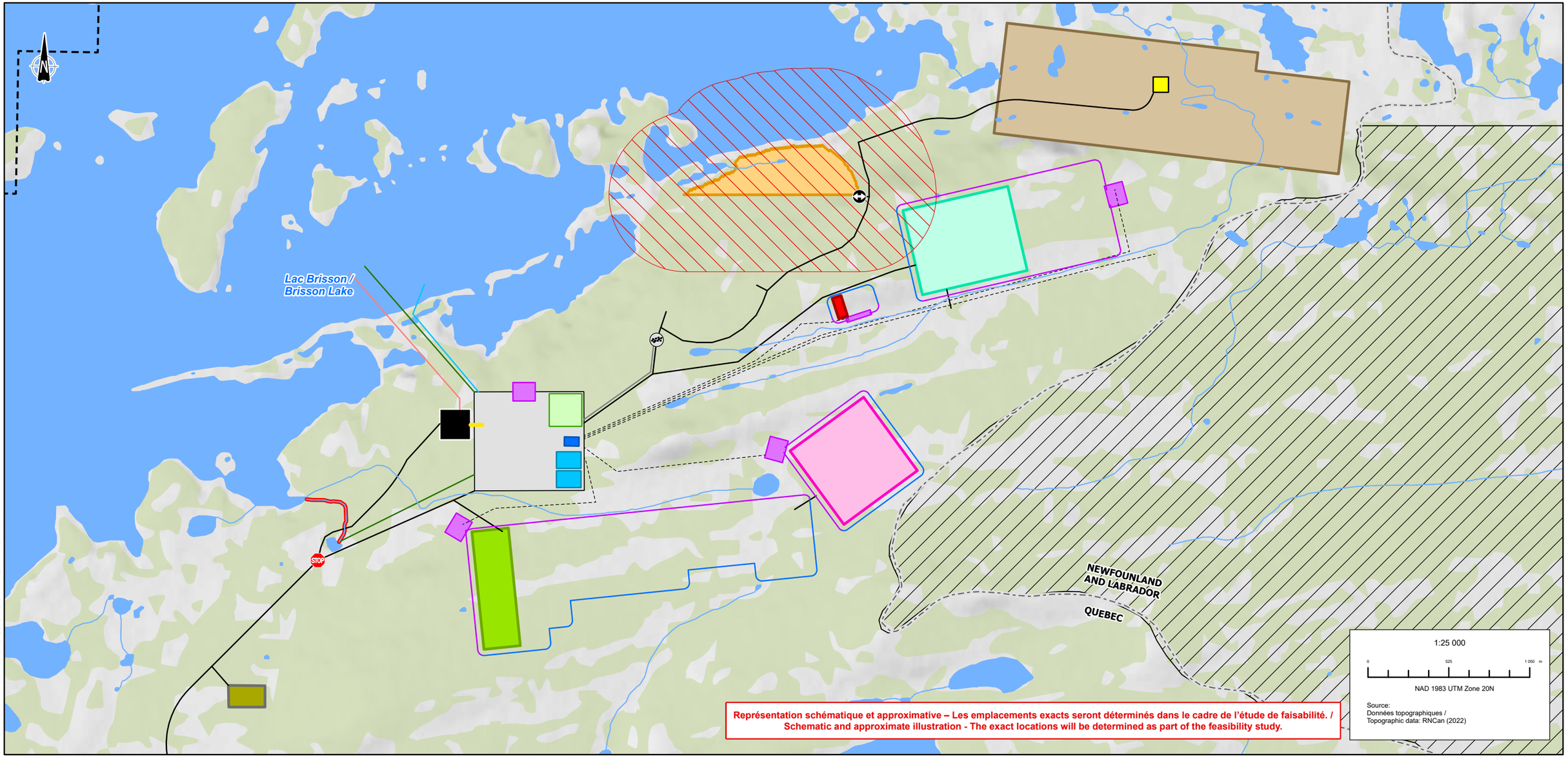
Carte 9-3
Composantes de la mine - Option A (20 ans) /

Map 9-3
Mine Site Components - Option A (20 years)

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composante de la mine / Mine Component

- Limite de propriété / Property limit
- Porte d'accès / Access gate
- Sortie de la fosse / Pit exit
- Station de concassage / Crushing Station
- Canalisation souterraine / Underground pipeline
- Convoyeur / Conveyor
- Point de rejet alternatif des eaux usées minières traitées / Alternative discharge point for treated contact and process wastewater
- Fossé d'eaux usées minières / Contact water ditch
- Fossé d'eaux de ruissellement du bassin versant / Non-contact water ditch
- Prise d'eau / Water intake piping
- Routes de service et de halage / Service and hauling roads
- Tunnel d'accès / Access tunnel
- Émissaire des eaux usées minières traitées / Treated contact and process wastewater outlet
- Émissaire des eaux usées domestiques traitées / Treated domestic wastewater outlet
- Aire d'accumulation des résidus miniers / Mine residue stockpile area
- Aire d'entreposage de mort-terrain / Overburden stockpile
- Banc d'emprunt / Borrow pit
- Bassin de collecte d'eaux usées minières / Contact water collection pond
- Camp permanent des travailleurs / Permanent worker camp
- Halde de stérile / Waste rock
- Fabrication et stockage d'explosif / Explosive manufacturing and storage facilities
- Fosse minière / Mine pit
- Minérai à basse teneur / Low-grade stockpile
- Stockage de carburant / Fuel tank farm
- Site d'enfouissement / Landfill site
- Zone industrielle / Industrial area
- Usine de traitement des eaux / Effluent treatment plant
- Bassins d'entreposage des eaux / Water storage ponds
- Zone de souffle d'explosion / Blast zone

Autre/ Other

- Frontière / Border
- Terres des Inuits du Labrador / Labrador Inuit Lands (LIL)

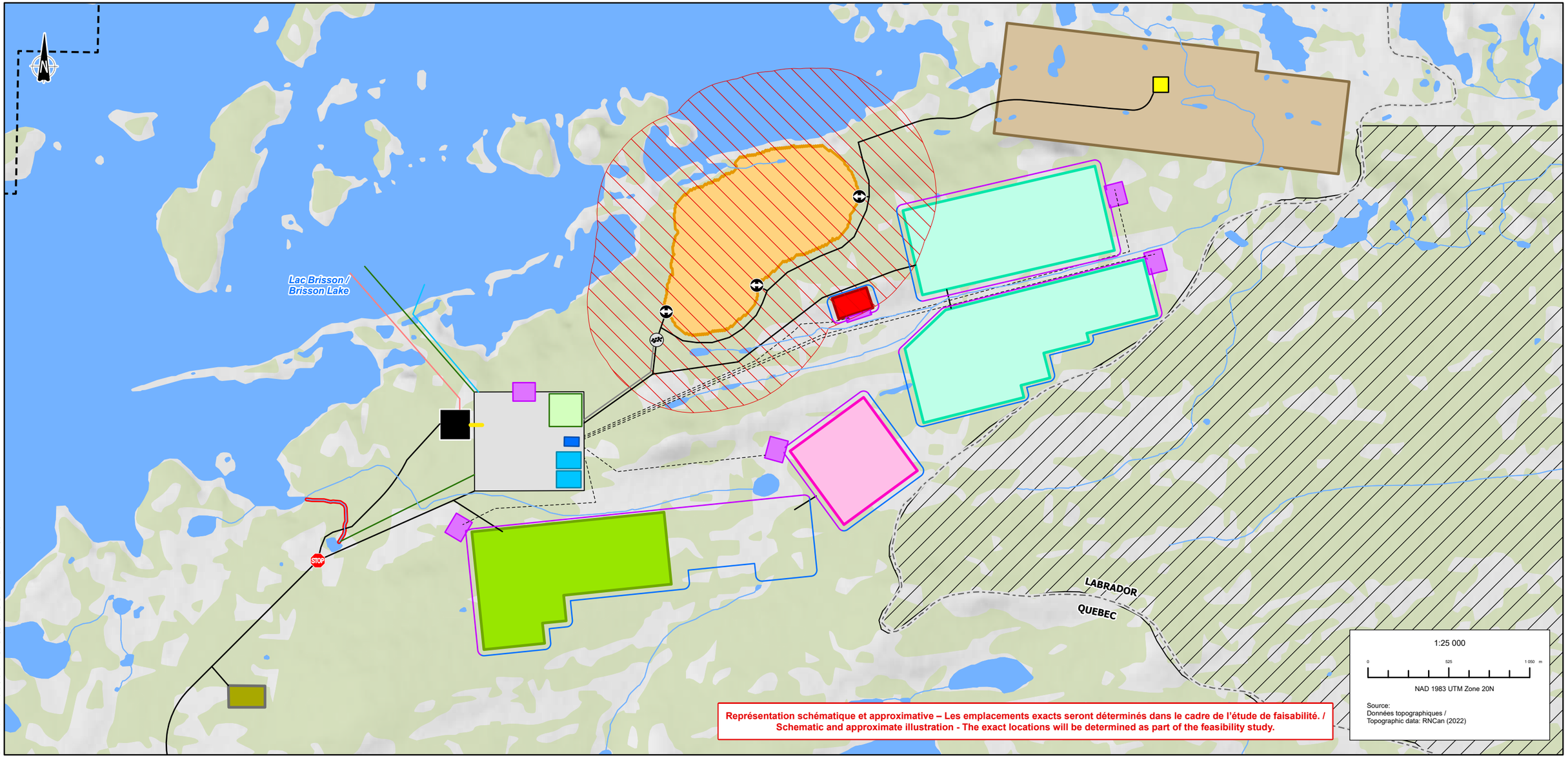
Carte 9-4
Composantes de la mine - Option A (5 ans) /

Map 9-4
Mine Site Components - Option A (5 years)

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composante de la mine / Mine Component

- Limite de propriété / Property limit
- Porte d'accès / Access gate
- Sortie de la fosse / Pit exit
- Station de concassage / Crushing Station
- Canalisation souterraine / Underground pipeline
- Convoyeur / Conveyor
- Point de rejet alternatif des eaux usées minières traitées / Alternative discharge point for treated contact and process wastewater
- Fossé d'eaux usées minières / Contact water ditch
- Fossé d'eaux de ruissellement du bassin versant / Non-contact water ditch
- Prise d'eau / Water intake piping
- Routes de service et de halage / Service and hauling roads
- Tunnel d'accès / Access tunnel
- Émissaire des eaux usées minières traitées / Treated contact and process wastewater outlet
- Émissaire des eaux usées domestiques traitées / Treated domestic wastewater outlet
- Aire d'accumulation des résidus miniers / Mine residue stockpile area
- Aire d'entreposage de mort-terrain / Overburden stockpile
- Banc d'emprunt / Borrow pit
- Bassin de collecte d'eaux usées minières / Contact water collection pond
- Camp permanent des travailleurs / Permanent worker camp
- Halde de stérile / Waste rock
- Fabrication et stockage d'explosif / Explosive manufacturing and storage facilities
- Fosse minière / Mine pit
- Ressource à basse teneur / Low-grade stockpile
- Stockage de carburant / Fuel tank farm
- Site d'enfouissement / Landfill site
- Zone industrielle / Industrial area
- Usine de traitement des eaux / Effluent treatment plant
- Bassins d'entreposage des eaux / Water storage ponds
- Zone de souffle d'explosion / Blast zone

Autre / Other

- Frontière / Border
- Terres des Inuits du Labrador / Labrador Inuit Lands (LIL)

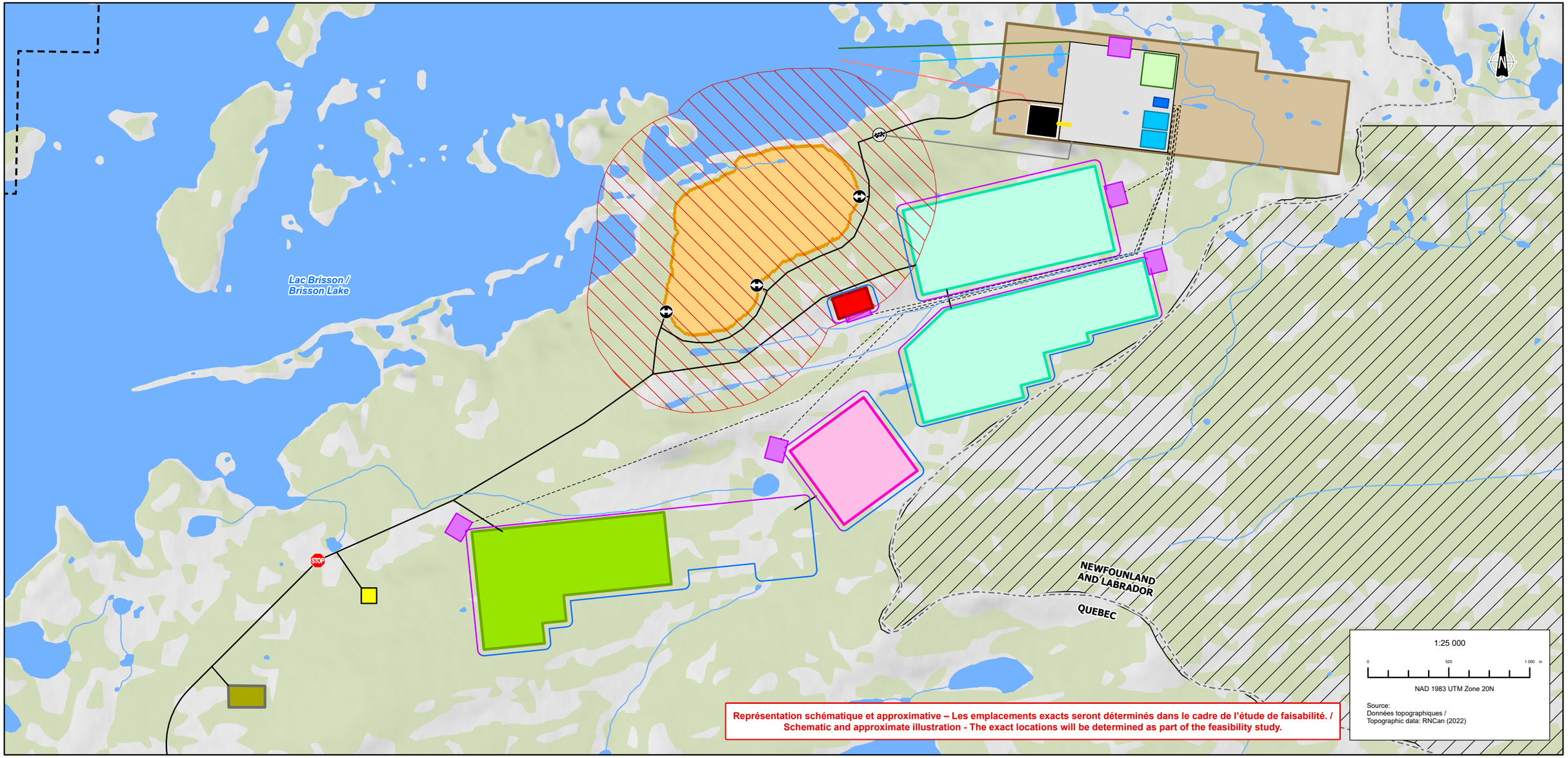
Carte 9-5
Composantes de la mine - Option A (20 ans) /

Map 9-5
Mine Site Components - Option A (20 years)

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composante de la mine / Mine component

- Limite de propriété / Property limit
- Porte d'accès / Access gate
- Sortie de la fosse / Pit exit
- Station de concassage / Crushing Station
- Canalisation souterraine / Underground pipeline
- Convoyeur / Conveyor
- Fossé d'eaux usées minières / Contact water ditch
- Fossé d'eaux de ruissellement du bassin versant / Non-contact water ditch
- Prise d'eau / Water intake piping
- Routes de service et de halage / Service and hauling roads
- Tunnel d'accès / Access tunnel
- Émissaire des eaux usées minières traitées / Treated contact and process wastewater outlet
- Émissaire des eaux usées domestiques traitées / Treated domestic wastewater outlet
- Aire d'accumulation des résidus miniers / Mine residue stockpile area
- Aire d'entreposage de mort-terrain / Overburden stockpile
- Bassin de collecte d'eaux usées minières / Contact water collection pond
- Camp permanent des travailleurs / Permanent worker camp
- Halde de stérile / Waste rock
- Fabrication et stockage d'explosif / Explosive manufacturing and storage facilities
- Fosse minière / Mine pit
- Ressource à basse teneur / Low-grade stockpile
- Stockage de carburant / Fuel tank farm
- Site d'enfouissement / Landfill site
- Zone industrielle / Industrial area
- Usine de traitement des eaux / Effluent treatment plant
- Bassins d'entreposage des eaux / Water storage ponds
- Zone de souffle d'explosion / Blast zone
- Banc d'emprunt / Borrow pit

Autre / Other

- Frontière / Border
- Terres des Inuits du Labrador / Labrador Inuit Lands (LIL)

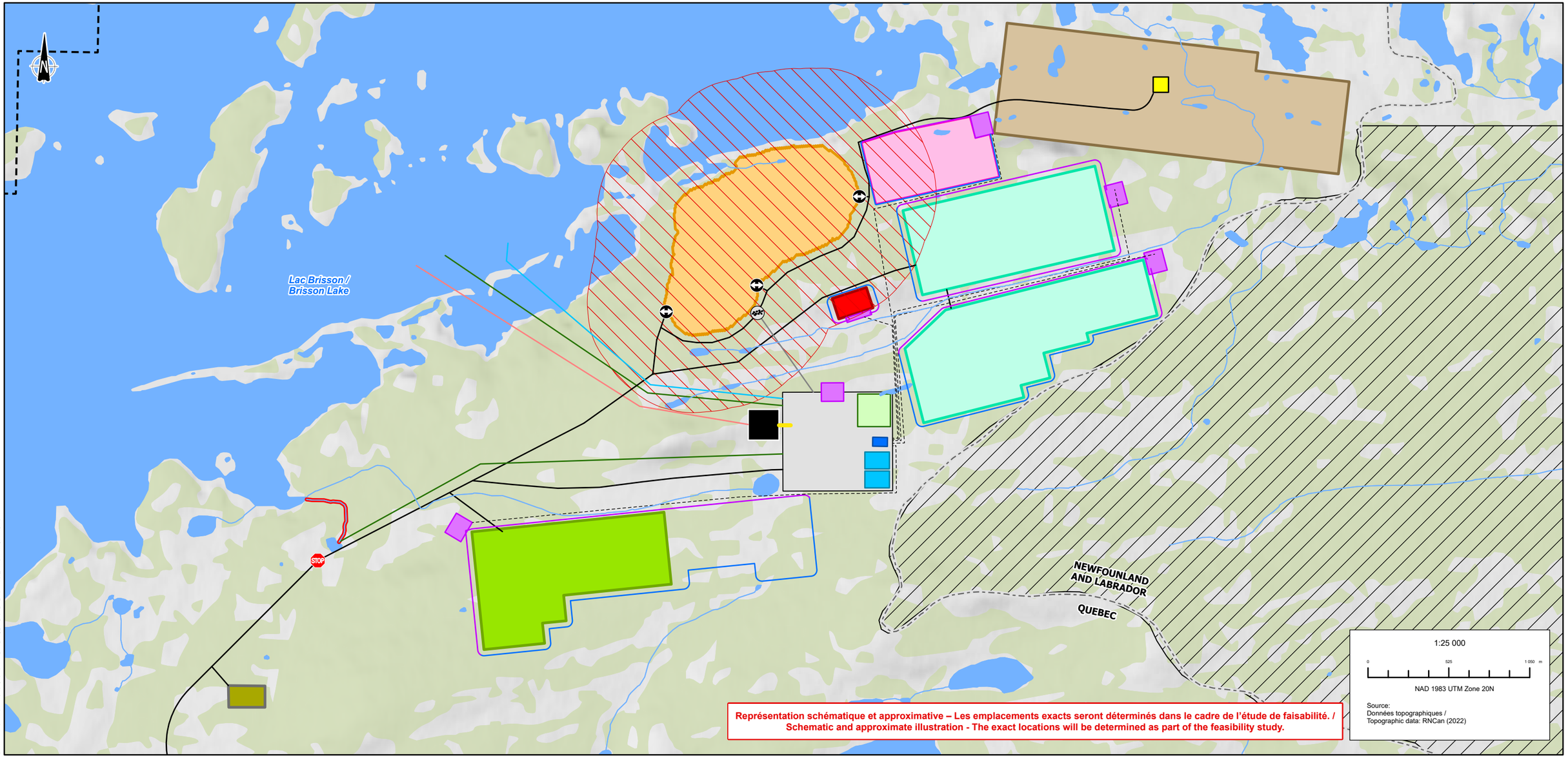
Carte 9-6
Composantes de la mine - 20 ans (Option B) /

Map 9-6
Mine Site Components - 20 years (Option B)

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composante de la mine / Mine Component

- Limite de propriété / Property limit
- Porte d'accès / Access gate
- Sortie de la fosse / Pit exit
- Station de concassage / Crushing Station
- Canalisation souterraine / Underground pipeline
- Convoyeur / Conveyor
- Point de rejet alternatif des eaux usées minières traitées / Alternative discharge point for treated contact and process wastewater
- Fossé d'eaux usées minières / Contact water ditch
- Fossé d'eaux de ruissellement du bassin versant / Non-contact water ditch
- Prise d'eau / Water intake piping
- Routes de service et de halage / Service and hauling roads
- Tunnel d'accès / Access tunnel
- Émissaire des eaux usées minières traitées / Treated contact and process wastewater outlet
- Émissaire des eaux usées domestiques traitées / Treated domestic wastewater outlet
- Aire d'accumulation des résidus miniers / Mine residue stockpile area
- Aire d'entreposage de mort-terrain / Overburden stockpile
- Bassin de collecte d'eaux usées minières / Contact water collection pond
- Camp permanent des travailleurs / Permanent worker camp
- Halde de stérile / Waste rock
- Fabrication et stockage d'explosif / Explosive manufacturing and storage facilities
- Fosse minière / Mine pit
- Ressource à basse teneur / Low-grade stockpile
- Stockage de carburant / Fuel tank farm
- Site d'enfouissement / Landfill site
- Zone industrielle / Industrial area
- Usine de traitement des eaux / Effluent treatment plant
- Bassins d'entreposage des eaux / Water storage ponds
- Zone de souffle d'explosion / Blast zone
- Banc d'emprunt / Borrow pit

Autre / Other

- Frontière / Border
- Terres des Inuits du Labrador / Labrador Inuit Lands (LIL)

Carte 9-7
Composantes de la mine - 20 ans (Option C) /

Map 9-7
Mine Site Components - 20 years (Option C)

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composante du projet / Project Component

- Site potentiel de l'usine de séparation des terres rares / Potential Site of the Rare Earth Separation Plant

Chemin de fer / Railroad

- Iron Ore Company of Canada
- Chemin de fer Arnaud (SFP Pointe-Noire)

Autre / Other

- Zone industralio-portuaire de Sept-Îles / Sept-îles industrial port area
- Limite municipale / Municipal boundaries
- Usine de filtration / Filtration plant
- Prise d'eau de la ville de Sept-Îles / Water intake for the city of Sept-îles

Source:
Données topographiques / Topographic Data: NRCan (2022)
Chemin de fer / Railroad: MRNF (2023)
Limite municipale / Municipal boundaries: MRNF (2023)
Prise d'eau de la ville de Sept-Îles / Water intake for the city of Sept-Îles: EXP (2013)
Usine de filtration / Filtration plant: EXP (2013)
Zone industralio-portuaire de Sept-Îles / Sept-îles industrial port area: Gouvernement du Québec (2018)

1:90 000

0 1 2 km

NAD 1983 UTM Zone 20N

Carte 9-8
Composantes de projet à Sept-Îles

Map 9-8
Project components in Sept-Îles

AECOM

\\canmtl1fp01\projets\Montreal\CS\Projets\TWW\60697312 Mine - Strange Lake\5100 CAD SIG\Livrables\09 produit\Data\ProjectDescription\

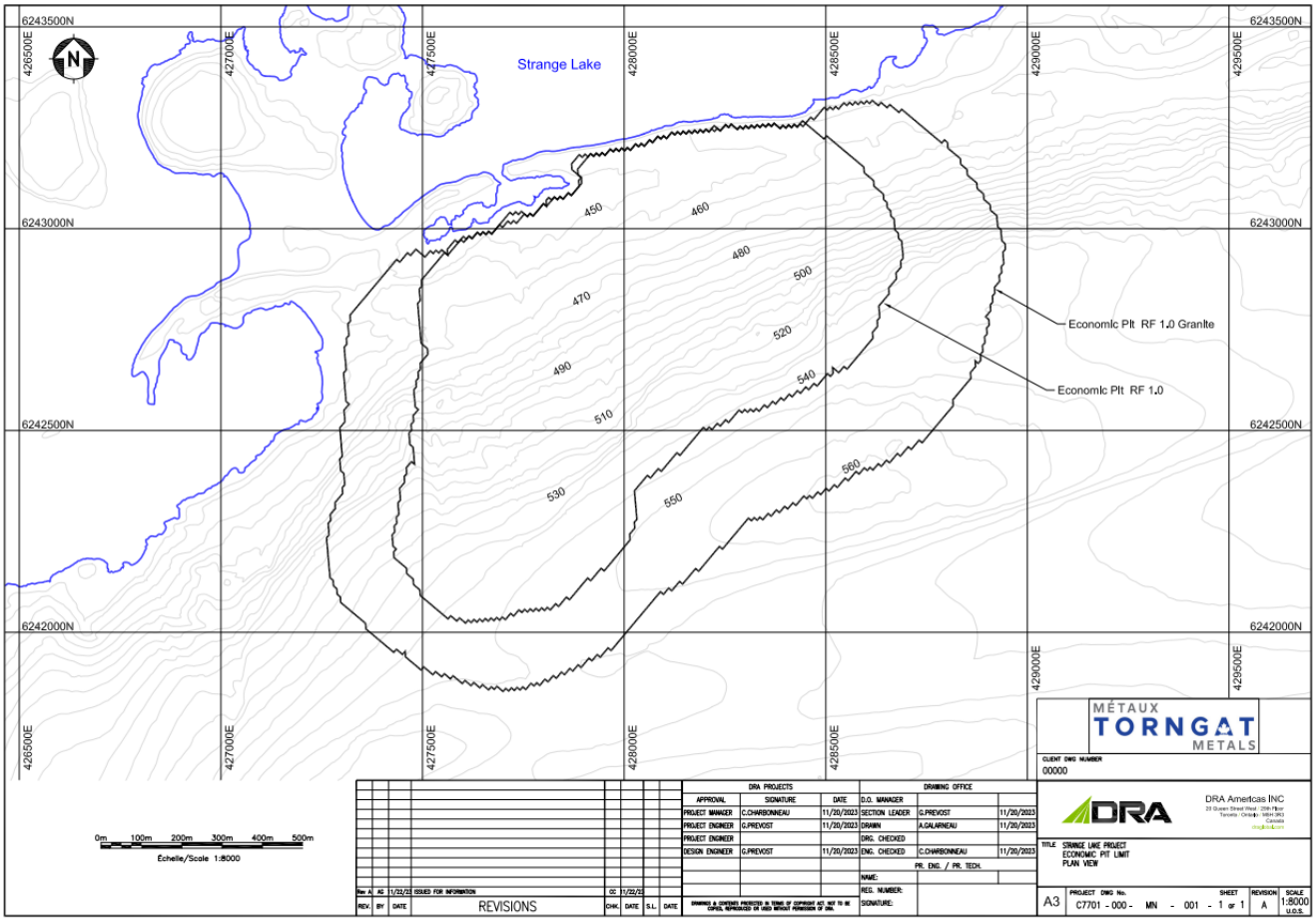


Figure 9-1 : Mine pit options (by DRA, 2023)

9.2.2 Explosives

The explosives manufacturing and storage facilities will be in the vicinity of the mine pit, within a radius of less than 5 km, at the eastern end of the road (Option A and C, Maps 9-5 and 9-7) or on a junction of the main access road (Option B, Map 9-6). The exact location of these facilities will be determined by ensuring that they are located at safe distances from other infrastructure and activity areas. Due to the proximity of the lake and water features, emulsion will be used as explosive. Emulsion generates significantly less nitrate species than ANFO.

9.2.3 Primary Crusher

The primary crusher will be located in an enclose building structure between the pit and the industrial area, for which three location options are considered (Option A, B and C, see Maps 9-5, 9-6 and 9-7). The crushed material will be transported by closed conveyor to the concentration plant.

9.2.4 Concentration Plant

The concentration plant at the mine site includes a series of physical separation processes that will significantly reduce the quantity of concentrate to be shipped to the Sept-Îles Rare Earth Separation Plant, which is described later in Section 9.5. The processes that will be used in the concentration plant are described later in Section 10.2.

The concentration plant will be located within the industrial area, for which three location options are considered (Option A, B and C, see Maps 9-5, 9-6 and 9-7).

9.2.5 Resource Pile

The low-grade resource mined will be stockpiled for processing after year 18 of the mine plan. The lower grade stockpile will be placed to facilitate future reclaiming as shown on Maps 9-3 to 9-7. The exact location will be determined following an *in-situ* verification considering technical and environmental constraints aimed at minimizing the potential effects on environmental components.

The maximum total volume of the low-grade stockpiles would be reached around year 18 of operation. The total surface area required for this low-grade storage is preliminarily estimated at 470 000 m^2.

The environmental design of the piles, to ensure groundwater protection and contact water treatment, will be developed according to the results of the geochemical characterization program, the *in-situ* conditions and the *Directive 019* (MDDEP, 2012).

9.2.6 Waste Rock and Overburden Piles and Soils

The volume of waste rock and overburden to be stockpiled includes the quantities coming from excavations for the construction of the collection pond(s) as well as for any surface infrastructure required for the operation site.

The maximum total volume of the waste rock stockpile is estimated at 152 200 m^3 (300,000) tonnes. The total surface area required for the waste rock is preliminarily estimated at 20 000 m^2.

The maximum total volume of the overburden stockpile is estimated at 9,35 million m^3 (11,7 million tonnes). The total surface area required for the overburden is preliminarily estimated at 980 000 m^2.

Wherever possible, overburden and waste rock will be placed in separate piles south or south-east of the mine pit (Option A, B and C, Maps 9-5, 9-6 and 9-7).

The potential for reusing waste rock will be assessed based on geotechnical and geochemical data to establish its technical and environmental feasibility. Ideally, the waste rock will also be used to backfill the open pit once mining is complete. Waste rock that does not leach metals or generate acid may also be used for the construction of dikes, roads and/or storage platforms. To date, the assessment of the Resource for levels of Sulphur and the testing completed to date indicate there is no real risk of acid rock drainage (ARD).

Similarly, topsoil or other soil suitable for revegetation will be characterised and stockpiled nearby for progressive or future site rehabilitation and the progressive remediation of the residue stockpiles. Soil stockpiles will be protected against erosion by vegetating the surface with site appropriate seeds.

To ensure the protection of the groundwater and to facilitate water treatment, the environmental design of the piles, will be developed based on the results of the geochemical characterization program, the *in situ* conditions and the Quebec's *Directive 019* (MDDEP, 2012). At a minimum, the design of the waste rock pile and the pile of overburden, will ensure that runoff from the piles is collected and directed to a settling pond for the treatment of suspended solids before discharge into the environment, should the water meet criteria. Should the water not meet criteria, it will be piped to the water treatment plant for further treatment. Stockpile characterisation such as geochemical and geotechnical studies are on-going and will inform further design of the waste rock and overburden pile.

9.2.7 Mine Residue Stockpile Area

The residues from the concentration processes, which includes fractions from the magnetic separation and the flotation processes, will be deposited in the mine residue stockpile. In order to minimize the potential environmental impact, and subject to the approval of the authorities, the residues will be filtered and dewatered (approximately 15% to 20% moisture), mixed with a cementing agent (anticipated 5 – 10%) to form a dry residue that is inert. This residue will then be transported by truck and deposited in the residuals management area, where they will be covered progressively as they are accumulated. The site will be prepared in such a way as to ensure appropriate

draining of the minimal seepage that is expected to occur. This will consist of installing a doubled waterproof lining and drainage layer (or other engineered lining evaluated as part of the feasibility study and impact assessment), below the stacked residues. Sensors will also monitor any seepage from the dry residues. Daily monitoring will verify compliance of each new layer of residue to be treated this way and confirm the integrity of the waterproof covering. This will ensure no significant generation of contact water with the residues and minimize the generation of contaminated water the needs to be treated. Once the stability of the stockpiles is confirmed, they could be progressively revegetated using the removed overburden from the pit.

Generally, cemented backfill is inert, however, seepage and kinetic studies will be performed in order to determine the percentage of cement to be used, the potential for long-term metal leaching and the potential source terms to be added in the water quality model.

Dry stacking of mine residue is an increasingly common management strategy. The dry cake has moisture content well below saturation. The advantages of dry residues include more efficient use of water, low seepage losses from the dry stack, the ability to progressively reclaim the tailings residue storage facilities, increased physical stability, reduced containment requirements, and simpler water management procedures.

Map 9-5 illustrates schematically the maximum expected size (defined by the limit of contact water ditch and non-contact water ditch) of this area for Option A, corresponding to the end of the Life of Mine (LOM) before active restoration. The total volume of the dry stack would be reached at the end of mine operation and is preliminarily estimated at 107.5 million tonnes. This size at that period would be similar for other mine layout options.

Additional geochemical and geotechnical studies will be conducted in order to inform the design of the mine residue stockpile area and the retention basin that will be used for sedimentation and/or retention for associated contact water treatment. The environmental design to ensure groundwater protection and wastewater treatment will be developed based on *in-situ* conditions and Quebec's *Directive 019* (MDDEP, 2012).

9.2.8 Access/Haul Roads

Access/haul roads will connect the mine to the various infrastructures within the site, i.e., the concentration plant, the camp site, other buildings as well as the stockpiles (resource, waste rock, overburden, and topsoil), the settling ponds, the residuals management area, the landfill site, and the airstrip. These roads will be unpaved and will have ditches collecting runoff water.

9.2.9 Aerodrome with a 1,500 m Runway

For the aerodrome or airfield at the mine, two options were retained after a more in-depth examination of the topography, aquatic features and drainage conditions, limitations related to surface obstacles, prevailing winds, and other environmental constraints, the distance of the facilities from the mine site and the alignment and length of the access road.

At the moment, both options are being compared with each other in a preliminary manner, according to safety, technical and environmental criteria. A grading analysis was developed for each proposed airfield (see mapping). Limitations of the grading analysis include the proposed runways, critical runway safety areas, and the surrounding airspaces based on Precision Approaches.

Subject to validation during future consultations and studies, the two preferred sites (labelled as 2 and 3 on mapping), located approximately 10 km from the concentration plant (#2 at 11 km, and #3 at 8 km), are the best option based on the following criteria:

- Prevailing winds – highest percentage of favourable prevailing winds.
- Environmental analysis – less potential impact on ecological systems and water resources.

- Grading analysis – no disturbance to topography in NL and a minimal limit of disturbance.
- Runway Safety Area and Airspace analysis – no impacts or penetrations to sensitive runway safety areas or surrounding airspace surfaces.

The airfield facilities can be operational 24 hours a day. The runway and taxiway, and apron area will be made from gravel.

The new airfield will also include a building for airfield maintenance and a fuel storage facility.

The runway is currently planned to be 1,500 m long by 30 m wide and in the initial construction phase of the project, which would accommodate aircraft models such as the Bombardier Q400 and the CC-130H Hercules.

The previous option detailed in the IDP (Option 1) was not kept as a viable option, mostly given that the alignment was not allowing for prevailing winds and owed to drainage conditions and aquatic features.

9.2.10 Other Buildings

The workers' camp will be modular in design and will meet industry standards for long-term and permanent accommodation for mine personnel, with additional space for truck drivers and other visitors. It is expected that enclosed walkways will connect the buildings, where possible. Its footprint in the environment includes the consideration of a protection zone around Lake Brisson. The width of this protection zone will be established based on the results of the hydrogeological modelling that will be carried out at the mine. This workers' camp will be located near the industrial area, for which three location options are considered (Option A, B and C, see Maps 9-5, 9-6 and 9-7).

A multi-purpose building which includes heated and unheated storage areas, locker room, laundry, medical and fire protection facilities, laboratory, offices, conference rooms, etc. will be implemented in the industrial area. Garages for maintenance, workshops, emergency vehicles and storage of emergency response equipment will also be in this industrial area.

9.2.11 Water Supply

Request for water supply involved water demand at the concentration plant, drinking water, and other water demands (sanitary needs). Mine layouts mapping (Map 9-3 to 9-7) outlines water intake piping, as well as preliminary contact and non-contact water ditches, discharge points for treated contact and process wastewater, and the contact water collection ponds.

In terms of water supply at the concentration plant, the primary objective is to avoid pumping water from Lake Brisson. A water management pond (WMP) will be built progressively during the construction phase to accumulate a water reserve and a minimum of 6-month water inventory of approximately 130,000 m^3 from precipitations and snow melt. Once excavation of the pit has commenced, water from the pit and stockpiles will also be diverted into WMP to be used in the concentration process. Environmental modelling of hydraulic resources for surface water, groundwater and interactions between them will be done to confirm potential sources and evaluate the impacts on the surrounding environment.

Once operational, the aim is to have a closed loop systems whereas much of the water as possible is treated and recycled within the system to prevent both intake and discharge. Water to replenish losses in the process will be sourced from the collection basin and contact water from the various stockpiles and from the pit. This will significantly reduce the quantity of freshwater required during operations. Processes at the concentration plant are currently being refined. Details of these processes will be presented in the ESIA.

Estimates for potable water assume usage of 250 L/person/day based on approximately 250 people in the camp. Lake Brisson is a potential source of drinking water for human consumption. The SG-1 esker located to the north of industrial area (mine layout Option A and Option C) or to the east of this industrial area (Option B) and the base camp is an underground water source which constitutes a second source of drinking water. Quality of the drinking water will be carefully monitored (Section 14.1.6.1) and the required water treatment will be established during the feasibility study; chlorination is not anticipated. A pumping station would be installed on the shore of Lake Brisson, with a water intake deep enough to avoid problems related to the accumulation of ice during the winter. A heat traced pipeline of approximately 1.5 km will bring the water to the treatment plant. A 5-meter-wide access path will also be built along side the pipeline to facilitate inspections and repairs.

More detailed analysis will be completed to confirm the source of drinking water that will be used, and the treatment required. Drinking water will be analyzed and treated before use according to Health Canada and Quebec's Standards.

A fire water tank, fed from the WMP, will be provided and connected to the fire protection system of the multi-purpose building and the camp. The water required for maintenance and for dust suppression will have separate containers.

9.2.12 Domestic Wastewater Treatment

An on-site sewage treatment plant will be constructed to effectively treat sanitary water from offices, washrooms and other facilities. Though still under development, treatments could include biological treatments, sedimentation and disinfection of the effluents. Septic systems would also be integrated into the treatment process, taking advantage of natural processes to mitigate the impacts of domestic effluents. Diffusers could also be used for the sanitary discharge, and they would be designed to ensure maximal dilution of any releases into the lake. To further minimize water use, greywater recycling systems are also being considered which would use water from sinks, showers and laundry as a water supply for non-potable purposes (toilet flushing, irrigation). Alternatively, Torngat Metals is in the process of evaluating the possibility of having the solid waste transported to an outside facility for treatment, and therefore only water would remain to be treated. Other option under consideration would be to integrate artificial wetlands in the domestic water treatment process and the use of greywater as a supply for dust suppression on-site.

9.2.13 Process Wastewater Treatment

A complete water treatment plant (WTP), capable of treating to the required criteria will be built on site. The water treatment and recirculation processes are now under development, the goal being a closed loop system. Studies are currently underway to determine how it can be achieved. All data will be provided, and mitigation measures will be detailed in ESIA. Currently, no discharge is anticipated for dryer periods in the winter, and in the summer (no rain).

All process water will be captured and reinjected in the process plant. There will be no discharge of those water, at any time. Should there be an upset in the plant, and the plant is shut down for an extended period, the water will be directed to a holding pond.

The surface runoff water, the seepage water from the stockpiles (including residue) and the pit dewatering water (originating from interception wells) will also be directed to the process plant for makeup water. However, it is possible that during periods of rain, or spring melt, the combined surface runoff water and pit dewatering water will exceed the capacity of the plant to use the water, which is on average 166 m^3/day. In that case, controlled discharge will be considered.

There are three potential discharge location for the surface runoff and ground water:

- The first and preferred option, is to pump the water to the top of a hill and let it run down through a creek like feature with engineered wetland sections. The return of treated water to the Lake would then be made more passively, and wetland features could be designed to further treat the water. This creek is known to have no fish downstream of the access road (2012, 2023). Further fish investigation will be completed in 2024 (see Map 14-3 for potential creek 3F/EF-15). If no fish are captured during sampling in 2024, testing will be undertaken to ensure that this scenario would be acceptable to environmental authorities and the public. This option will be evaluated in the ESIA.
- The second option is to discharge directly to the Lake Brisson in the most proximal bay (option not illustrated). Although of less technical complexity, this option would not warrant enough dilution before the water reaches the lake. Data from bathymetry surveys conducted in 2023 indicates that there is no significant flow in Lake Brisson given the presence of shallow bays and islands. It would be very difficult to achieve proper mixing of water with the standard technologies. For this reason, this second option is not retained.
- The third and final option is to discharge in the lake, via a diffuser. However, data from bathymetry surveys conducted in 2023 indicates that there is no significant flow in Lake Brisson given the presence of shallow bays and islands. Therefore, it would be very difficult to achieve proper mixing of water with the standard technologies. This option will be evaluated in the ESIA.

9.2.14 Power Supply

The power requirements of the mine, concentration plant and all other on-site facilities are estimated at 15 to 25 MW, most likely around 20 MW. Since there's no power grid nearby, Torngat Metals will build and operate an onsite power plant based on diesel generators and is considering using geothermal energy to reduce the use of fossil fuels as much as possible.

As explained later in Section 9.6, Torngat Metals could also be interested in purchasing energy from third-party renewable energy projects, if such opportunities arise in the future.

9.2.15 Fuel Storage and Supply

Fuel supply (arctic diesel) will be primarily by fuel tanker to the mine site, as required. At the mine site, the fuel will be transferred from the fuel tankers to an unloading and storage area which will be equipped with an appropriate containment area. The fuel will be stored at mine site in 4 to 6 above ground bunded API 650 column supported flat roof storage tanks or alternatively self-contained storage tanks will be used. At this stage of project development, it is estimated that the tanks at both mine site and port facilities (see Section 9.4) will have a total capacity of 120-150 million litres). The tank farm at the mine site would be located in the industrial zone (see Maps 9-5, 9-6 and 9-7), but various options will be studied and compared as part of the pre-feasibility, feasibility and impact assessment studies.

Double-walled aboveground pipes will connect the tanks to the generators. A fuel distribution station will be installed for the supply of heavy and light vehicles.

Subject to validation by the feasibility and pre-feasibility studies, a 30 m^3 capacity tank will be installed at the airfield for the storage of aviation fuel. This fuel reserve is intended for emergencies.

9.2.16 Stormwater Management (outside activity areas)

All stormwater that has not been in contact with the mined material, residues or mine activities (non-contact water) will be diverted from the work areas by a network of non-contact drainage ditches.

9.2.17 Waste and Contaminated Soil Management

Waste reduction at source, recycling and recovery channels will be favoured. To the extent practical, recyclable materials will be compacted on site before being transported to secondary materials markets using the same means of transportation as for supply. Residual hazardous materials and special waste will be stored on site in secure storage areas equipped with containment areas, before being shipped to authorized facilities for treatment or disposal (see Section 24.1 for further details). A possible northern landfill that complies with the requirements of division 4 of chapter II of the *Quebec Regulation respecting the landfilling and incineration of residual materia*ls might be required to receive non-hazardous residual materials that cannot be recycled or recovered. The supposed location of this landfill would be along the access road west of the mining facilities (see Maps 9-5, 9-6 and 9-7), but other options might be considered and compared as part of the feasibility study and impact assessment.

Torngat Metals intends to install contaminated soil management collection platforms (contained designated areas) at the mine site and, as explained later, at the container storage and handling site near the Port. These platforms are intended to receive any soil contaminated by accidental spills of petroleum products (diesel, oils, etc.) or chemicals that have occurred during handling, transshipment or accidental events. The need for such facilities stems from the remoteness of Torngat Metals' facilities from service providers in this field.

The exact location and the technical and functional characteristics of these facilities will be determined as part of the feasibility study and impact assessment.

9.2.18 Emergency Response

Medical and emergency response facilities, including fire trucks, will be in a multipurpose building near the workers' camp. An ambulance will be available and parked in a dedicated space and an infirmary will be set up in the workers' camp. A storage area for environmental emergency equipment will also be provided in a centralized location in case of a potential incident (i.e., spill).

9.2.19 Construction

9.2.19.1 Shipping During Construction

All shipping and associated activities (crews, provisions, refuelling and other supplies, waste management, etc.) will be contracted to a third party for both the Construction and Operations Phases of the project. The potential shipping route(s) would be very similar to the route used by construction supply ships accessing Vale's current port installation. Shipping during the Construction period would transport incoming equipment, materials and fuel. Recyclable materials, hazardous wastes, other materials and returning rental equipment would be periodically shipped off-site.

9.2.19.2 Access Road and Airstrip

Construction work at the mine site will begin with the completion of the last portion of the access road located in Quebec (0 to 18 kilometres of the road chaining) and the development of the airstrip. Depending on the time required to build the access road (technical complexity and final distance), the need to approach the access road from multiple points would need to be considered.

The airfield is developed based on a few different aircrafts, which determine the airfield characteristics. The runway "group" is based on the Hercules while the runway length is actually based on the Q400 and Metro III. The runway group defines the length and width of the runway safety areas. At the moment, the Q400 is the critical aircraft in terms of runway and taxiway width.

A short temporary airstrip can currently be used by Twin Otter or smaller aircraft. This track is located along Lac Brisson approximately 400 m east of the temporary mining exploration camp. A temporary dock, also located near the temporary camp, could also be set up on the shores of Lac Brisson to accommodate seaplanes in the summer.

9.2.19.3 Camp, Mine, and Facilities

In addition to expanding the existing exploration camp as required, temporary camps may be established as part of site preparation and road construction at the mine site. Temporary worker camps might be established outside the mine site during construction, in particular during construction of the access road. Options on this subject will be examined as part of the feasibility study and impact assessment. However, once the mine is in operation, there will only be one camp at the mine site and possibly one smaller camp at the Voisey's Bay port.

Excavation at the mine site will follow the road construction and will begin with the development of the water treatment plant, the maintenance facility area and the fuel storage area as well as the construction of the various access roads to the site.

The hauling roads will be designed for trucks with a capacity of 100 tonnes payload. These roads will be built and extended as needed during pre-production and operation.

A borrow pit is located on esker G-1, approximately 2 km east of the B-Zone. This zone will first be mined for sand and gravel required for the civil works related to roads and preparation of the low-grade stockpiling area. Once levelled, part of this area can also be used as a temporary storage area. It should be noted that the eastern part of this esker is already being used by Torngat Metals as a temporary airstrip as part of its exploration activities and might be used during the pre-development phase.

Subsequently, the construction of the concentration plant, buildings, fuel storage tanks and the installation of temporary generators can be undertaken. In addition, the civil work to lay out the foundation of the various storage areas and the settling pond(s) will be carried out

Next, the steel structures and mechanical equipment will be installed at the concentration plant and the residue thickening/filtration area. Finally, the electrical and instrumentation work will be completed, and the commissioning of all systems will take place.

9.2.19.4 Explosives

The selected explosives supplier will be responsible for the construction of an emulsion plant on the mine property (see Section 9.2.2).

9.2.19.5 Stockpile Areas, Borrow Pit

A drainage system consisting of contact water ditches and retention ponds will be built to receive the runoff water drained within the various stockpile areas (low-grade stockpiles, waste rock pile, mine residue stockpiling area, etc.) and to prevent mixing with non-contact water runoff from outside the operating areas. Retention ponds will be located at the lowest elevation of each associated watershed and will avoid the mixing of water from different sources before the sampling points. A water treatment plant will also be installed, as well as a network of pipelines to convey the contact water from the ponds to this system.

Designs of the stockpile areas will be developed as part of the pre-feasibility and feasibility studies.

The development of a borrow pit area is currently planned at the mine site to provide construction materials (see Maps 9-3 to 9-7). In addition, hauling and service roads will be constructed that will connect the plant, the borrow pit and stockpile areas.

9.2.20 Operation and Maintenance

9.2.20.1 Mining Operations

Mining will be operated by Torngat Metals with its own equipment and personnel. The mine will be operated according to an optimal material extraction sequence developed over a period of 30 years. Mine operations include:

- drilling and blasting.
- material excavation and transportation (hauling) to the processing area.
- excavation and transportation of waste rock to the waste rock pile.
- excavation and transportation of low/medium-grade material to the low-grade stockpiles.

9.2.20.2 Explosives

The explosive supplier that will be selected will be responsible for supplying emulsions, non-electric detonators and other blasting accessories that will be used by the blasting team in the pit.

9.2.20.3 Mine Dewatering

Pumping of water from and around the pit will be required to prevent flooding of the mining operations The in-pit water originates from three possible sources: surface water (precipitation and runoff), infiltration of groundwater and potentially infiltration from Lake Brisson through a fault. Water collection sumps will be constructed and maintained at the bottom of the pit in order to pump the water and direct it, if necessary, to the treatment system. Groundwater flowing towards the pit (and which will not have been in contact with the material of the deposit) can be intercepted by a network of dewatering wells on the periphery of the pit from which it can be pumped and discharged either into the environment should it meet discharge criteria or used as a source of water.

9.2.20.4 Dry Comminution (primary crushing)

The dry comminution (primary crushing) processing units will be designed to operate 365 days a year, 16 hours a day.

9.2.20.5 Concentration Plant

The processes that will be used in the concentration plant are described later in Section 10.2. In terms of operation this will include, primary wet grinding, magnetic separation, fine grinding, flotation, and dewatering and filtration equipment designed to operate 365 days a year, 24 hours a day.

9.2.20.6 Concentrate Packing

The concentrate will be bagged in FIBC (Flexible Intermediate Bulk Containers) bags, hereinafter referred to as “FIBC bags”, “bulk bags” or “super-bags”. These super-bags will then be placed in containers for shipping. No material will be shipped in bulk. Each FIBC bag can contain 1 to 2 tonnes. Testing of the concentrate is ongoing and subject to the final concentrate classification. The final specification for these FIBC bags will be determined. Selection will be guided by the Canadian Regulations Volume III Transportation: *Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials* (NORM) (Health Canada, 2021). It should be noted that FIBC bags are placed within shipping containers and then transported.

9.2.20.7 Mine Residue Management

Residue fractions from the magnetic separation and flotation processes constitute the residues from the concentration processes. These residues, generated in a wet environment, will be thickened (gravity segregation), filtered and managed in the mine residue stockpile area as previously described in Section 9.2.7.

Seepage from the concentration processes residues is expected to be low due to the low hydraulic conductivity of these materials and the addition of a cementing agent. Contact between residues and groundwater will be minimized by installing an engineered lining system and a drainage system within the mine residue stockpile area. Any potential seepage will be collected and transported via a pipeline to a collection pond where it will be used as a water source for the concentration plant or to the water treatment plant where it will be treated, if necessary, before being reused in the concentration process.

The residues will be progressively covered with an impermeable layer to reduce as much as possible water contact with the residues and the potential for dust dispersal. Runoff and snowmelt non-contact water from the surface of the mine residue stockpile area will be collected by a system of peripheral contact ditches and treated, if necessary, before being discharged into the environment.

The mine residue stockpile area will also be surrounded by a system of non-contact water ditches, drains and dikes to collect non-contact surface water runoff and divert it from the stockpile area. Additional drains/ditches will be installed as needed during successive construction stages over the LOM. The non-contact diversion system will be constructed in stages to maximize the non-contact runoff diversion potential of the mine area.

Once permanently covered, residues could undergo progressive revegetation to further protect them from the elements and restore portions of the site during the LOM.

9.2.20.8 Emergency Response

Qualified personnel trained in first aid and emergency response will be on-site. When required, an air ambulance will be available to transport patients to a hospital facility located in a major center such as the Labrador Health Center located in Happy Valley-Goose Bay. These same centers may be called upon to provide support in the event of an environmental emergency.

9.2.20.9 Discharges into the Environment

The main potential discharges and emissions from project activities at the mine and concentration plant site are presented later in Section 24, in addition to those already presented in this Section 9.2, particularly with regard to residues and water management. A summary of wastes generated, air emissions (including noise and light emissions) and potential liquid discharges are described in Section 24, including an overview of their management. The technical details will be presented in the Feasibility Study report to be produced later, which will be incorporated into the detailed project description, and in the ESIA for the project.

GHG emissions are detailed in Section 23.

9.2.21 Closure and Restoration

Torngat Metals will prepare a conceptual closure plan that meets the requirements of Quebec *Loi sur les mines - Mining Act* and the *Guidelines for preparing mine closure plans in Québec* (*MERN, 2022*). The initial conceptual closure plan will be refined as the mine activity progresses. It is anticipated that the plan will be updated every five years.

The closure and reclamation strategy for the proposed Torngat Metals mining project is envisioned as a collaborative effort, recognizing the vital importance of engaging with local Indigenous communities and safeguarding the delicate ecosystem, particularly the caribou habitat in the northern region. The approach hinges on methodology for closure visioning, ensuring a comprehensive and inclusive process in developing a shared closure vision. Through extensive consultations with local Indigenous communities, the closure vision will be co-

created, aligning with the cultural, social, and ecological values of the affected communities. The closure plan will prioritize the protection of wildlife habitats, with a specific focus on caribou preservation, incorporating scientifically sound measures and sustainable practices. Typically, this will consist of returning the site to original conditions to the extent practical. The pit will likely be water filled and the residues will be covered with climate appropriate vegetation. All infrastructure will be deconstructed.

These aspects are important as they will eventually guide the development of the Reclamation and Closure Plan, including closure prescriptions for the site. If the closure vision / objectives are developed early on in the mine life, this allows for development of closure designs for site infrastructure (waste rock facilities, stockpiles, mine residue stockpile area, etc.) in such a way that reduces long-term liability and costs associated with closure and create successful reclamation. Additionally, this information is done in collaboration with stakeholder representatives through engagement sessions. Regulatory requirements for closure and reclamation of the project will be included when focusing on closure planning and closure plan development.

In addition, a Failure Mode Effect Assessment will be completed on the closure design to highlight risks ranked high and what mitigations or additional studies need to be completed in order to lower the risk. This will allow for data gaps to be identified and filled through additional studies as the project progresses.

Furthermore, the Reclamation Research Projects (RRPs) will be an integral part of the early development phase to enhance the understanding of the local environment and inform closure and reclamation strategies. These research initiatives will be designed to address specific concerns related to the mining project's impact on the ecosystem, providing valuable insights into sustainable reclamation practices. The involvement of local communities in these research projects will not only contribute to the generation of localized knowledge but will also foster a sense of ownership and responsibility among community members. Through the engagement process, community feedback on closure vision will be used to inform revegetation strategies not only for the desired native species that will be used to restore the site but also the proposed methodology for revegetation. Extensive baseline studies that will be conducted as part of the ESIA process will cover comprehensively the vegetation on site and fauna use prior to proposed project disturbance.

Following *Directive 019*, the overburden layer will be kept, and vegetation with rooting system as well. This will be included in the Geotechnical program and will be monitored and will be included in the closure plan.

It is anticipated that the end land use will be to provide wildlife habitats and that disturbed areas will return to their pre-mining condition such that traditional uses of the site can resume. It is also expected that there will be progressive restoration for the mine residue stockpile area, and any other suitable areas throughout its operation. According to the current mining plan scenario, the rehabilitation of the open pit will not begin until the end of its development, i.e., after year 18 approximately. Water treatment will be maintained until the water and seepage areas have achieved criteria. Typically, the closure plan is divided into sections.

1. Progressive restoration, throughout the LOM.
2. Active closure, where the buildings and ancillary structures are deconstructed, restoration is accelerated, and water treatment is maintained.
3. Passive closure, where water treatment is not required anymore, all areas are restored, and periodical sampling occurs.

The duration of the post-operation and post-restoration monitoring programs will be in accordance with the *Guidelines for preparing mine closure plans in Québec (MERN, 2022).*

9.3 Single Lane Access Road (seasonal and private) Between the Mine and the Eastern Coast of Labrador

9.3.1 Access Road Options

The containers of concentrate must be transported to the separation plant that will be located in Sept-Îles, Quebec (see next section and Section 10.2). Thus, four access road options were considered and of the four, two were selected for further studies.

- Option A is the alignment from the mine site to the port of Vale, in Anaktalak Bay.
- Option B is a Quebec only access road and linked the mine site to the city of Schefferville.
- Option C is the alignment from the mine site to Voisey's Bay.
- Option D is the alignment from the mine to the Smallwood reservoir, where it would join the NF provincial road system.

The decision to bring forward an option was based on the following guiding principals:

1. Minimise Environmental Impacts
2. Minimise impacts on land Use
3. Financial

Option B and D were not brought forward as they were associated with significant environmental impacts due to their total length (380 km for Option B and 290 km for Option D), that also increases the potential number of water crossings. In addition, due to the length of the road, an overnight camp would have to be built along the road for health and safety concerns, thus having an additional impact on land use. It is also important to note that both options would have been over 600M$ to build.

In contrast, Options A and C are both shorter, 172 km for Option A and between 168 to 188 km for Option C depending on the sub-variants (C1 and C2 respectively). Both options are also economically feasible. On a corresponding scale of 1:50,000, a minimum of 150 water crossings are encountered along Option A, whereas Option C1 would have a total of 126 (113 water crossings in Labrador and 13 in Québec). Options A and C would require new port facilities such as a container storage area, a container crane and other storage facilities (to be confirmed by the feasibility study) to be implemented. The construction of a floating dock allowing handling on barges will also have to be put in place for option C.

Therefore, Option A and Option C have been kept and further studies will be conducted to evaluate which option has a lesser impact. At this time two alignments are still presented and mapped for Option C. This is to outline a broader study area for the access road, as the preliminary engineering design is still ongoing.

1) Alignment C1: this alignment stays on the plateau north of the Konrad brook and aims to minimize water crossings and to avoid major streams and rivers. However, this option may require some blasting.

2) Alignment C2: this alignment will be a forestry type road and will aim to have a low constructability (easy build-up, with no large cut and fills). However, this option has potentially more water crossings and is closer to brooks used by local communities for fishing and hunting. This characteristic is also shared with Option A.

If option C is the selected option, the actual access road may vary from the alignments as the engineering design is still ongoing, but this will be in this corridor.

9.3.2 Construction

A new single lane access road will be built to connect the mine site to a new container storage and handling facilities on the eastern coast of Labrador, NL. The total length of the access road is estimated to vary between at 160 km and 188 km, depending on the chosen alignment (Maps 9-1 and 9-2). The first 18 kilometres from the mine site are located on the territory of the province of Quebec. Outside the mine site, the preliminary design envisions a seasonal access road with the following characteristics: a gravel surface capable of withstanding the expected traffic; a single lane with a width of 6 m including the travel lane (4.5 m) and the shoulders (0.75 m on each side). Beneath the travel lane and shoulders, a base layer of fill material, approximately 1 m, will be put in place for the first 100km from the provincial border. This layer of material will provide foundational support for the road. Also, the fill material will be shaped to slope at a ratio of 2H:1V on the sides under the shoulders, extending into the ditches, which helps in stabilizing the road structure against lateral movements and erosion. The surface of the travel lane and shoulders will be topped with 200 mm material, ensuring a smoother riding surface and reducing dust. A ditch will be located on either side of the shoulders, and they will be designed to be no deeper than 1 m, with a slope ratio of 2H:1V (2 horizontal to 1 vertical), facilitating adequate drainage while maintaining the stability of the ditch walls.

Figure 9-2 shows the typical roadway cross-section. As mentioned, the construction for the access road will follow a forestry road design, meaning that the road build up will be kept to a minimum to follow the natural profile of the land. Another alternative that was considered, not shown here, was the construction of a seasonal low-speed road not designed for road vehicles; this option would have required the use of more robust off-road trucks. The road layout and design features will be determined in more detail as part of the pre-feasibility and feasibility studies.

Studies are underway to optimise the Road corridor. Currently, a total of 286 water crossings is reported along Option A: 13 out of the 286 are in Québec (4,5%), and 273 are in Labrador (95,5%) with three main water crossings planned (one span bridge and 2 arch culverts) for #WC 116, #WC 177 and #WC 555. Option C alignments (C1 and C2) share the same alignment in Québec, likely up to the first bridge (#WC 116), but a southern direction is then taken towards Voisey's Bay crossing two other main river, #WC 566 and #WC 596. For Option C1, a total of 126 potential water crossings can be observed on a scale of 1:50 000. For Option C2, using 3D satellite imagery, therefore a more precise assessment of the potential water crossings has been completed. A total of 298 water crossings could be encountered from the provincial boundary to the coast. Appendix E provides a mapping of the road access options, identifying all potential water crossings from current assessment. During the ESIA, all water crossings will be visited through aerial surveys, and some with ground surveys (see Section 14), allowing appropriate measurements for habitat types and proper culvert sizing.

Standard road construction methods would be adapted to northern conditions. Partial cleaning of vegetation would occur, permafrost would be protected as potential areas are mapped since the planning design phase. Reuse of material excavated at the mine site would be prioritized for the portion of the access road located in Quebec. Any extra materials needed for the roadbed would be locally obtained material. Temporary worker camps might be established outside the mine site during construction. Options for the temporary camps will be examined as part of the feasibility study and impact assessment.

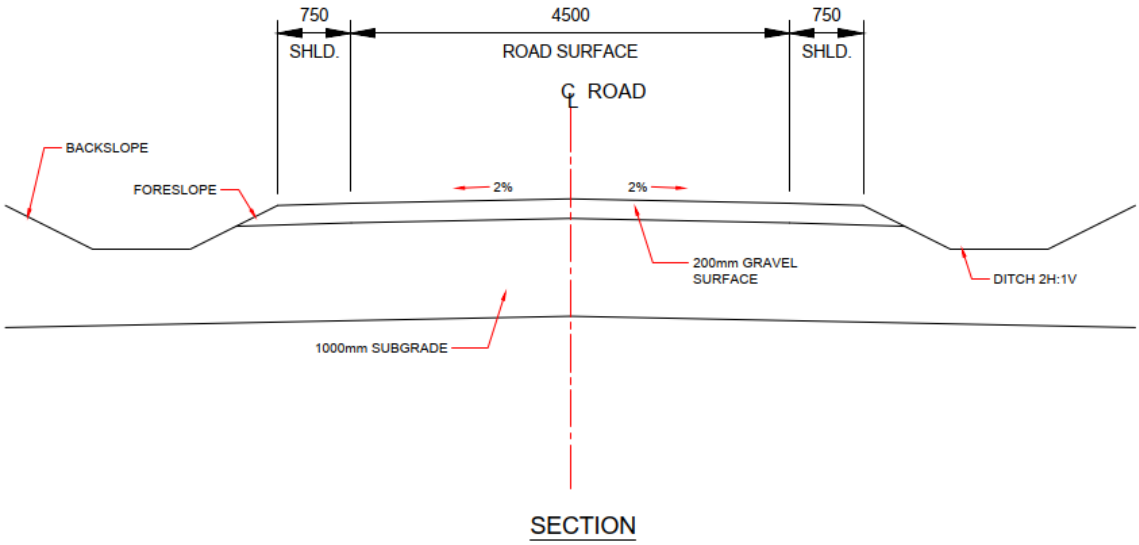


Figure 9-2: Schematic cross sections of the access road. The road design will evolve during the project feasibility study

9.3.3 Operation and Maintenance

Overall, three main types of cargo will be shipped to and/or from Torngat Metals' operations: concentrate in superbags inside containers, fuel and raw materials/general cargo mainly in containers. The latter would include incoming supplies such as food, chemicals used in the flotation process and in the water treatment, consumables used for machinery and facility maintenance, material, equipment and outgoing waste, other excess materials and any equipment no longer in use.

The concentrate will never be transported in bulk. The transportation will be carried out in accordance with the requirements of the *Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM)* (Health Canada, revised 2011*)*. Trucking of concentrate from the mine site will involve transportation of mining material placed into superbags, and superbags will be loaded into maritime containers having a 30 tonnes capacity.

Raw materials and general cargo, also packed into maritime containers, will be sent from the Port to the mine in general by the same trucks (roundtrip).

Fuel will be transported by tanker trucks from the Port to the mine. At this stage, it is anticipated that this will be transported with 30,000 L tankers.

It is assumed that the seasonal access road between the mine site and the eastern coast of Labrador would be only available during 3 to 5 of the winter months, because temperatures need to be below zero degrees Celsius for the low-bed trucks transporting the containerised concentrate bulk bags. The rest of the year the road will only be used on a limited basis by light vehicles (road inspections, environmental monitoring, emergency transport of people, etc.) and essential maintenance vehicles.

It is envisaged to use truck with "pup" configuration in order to reduce the number of daily trips for both container and tanker loads. The preliminary estimate of the total traffic (containers and tankers) on the seasonal road is estimated to be between 5,000 to 10,000 trips, depending on whether pups are used or not. Thus, over 5 months of cold (150 days), an average of 33 to 66 trips per day is projected.

Safety huts for emergency sheltering purposes will be constructed along the road. There will be pullover / passing stations every 10-15 km, typically allowing for 2 trucks. Pull overs can also be used by drivers for rest periods when feeling fatigued.

Additionally, in normal driving situations drivers will be given up to one hour rest before any turnaround leg while trucks are being unloaded / loaded. In cases where the drivers working hours will not allow a safe return, they will be accommodated at either the Concentration Plant or at the port facilities until they are fit to drive safely.

Road weight limits are adjusted seasonally, particularly during the spring thaw, to prevent damage to the road(s). These adjustments are made because the ground becomes unstable due to the warmer weather leading to weakened roadbeds. The road is a private road, though Torngat Metals intends to follow the principles for load restrictions on public roads in order to limit any damage. Currently the road is designed for the larger under freezing conditions, though this can vary subject to weather conditions in the preceding days.

All vehicles using the access will be equipped with GPS tracking and with speeds limited to 55kmph. GPS systems will allow for “live” monitoring of vehicle traffic (by radio systems etc.) to avoid conflicts, relay weather conditions and control traffic from either the Concentration Plant or at the port facilities.

Dynamic Speed Limits (DSL) will be implemented to adapt to changing weather conditions (wind and snow, etc.).

Truck operations and road maintenance will be done either by Torngat Metals directly or contracted to a local Indigenous owned business. Road maintenance would include grading, resurfacing and plowing-scarifying-sanding.

Torngat Metals aims to construct a private single-user mine access road with a minimal footprint while maintaining safe operations. Torngat Metals is open to consider future modifications to the design of this road, for instance if other users are interested in using the road. However, any modifications to this effect are not included in the present project.

9.3.4 Closure and restoration

As with the mine site infrastructure, the current intention is to deconstruct the road and return it to original condition to the extent practical. However, should local communities wish to have other uses for the road, Torngat Metals will study the possibilities with the local communities.

9.4 Port Facilities, Container Storage and Handling Facilities and Transportation of the Concentrate to Sept-Îles

During operations, the containers of concentrate will be shipped by trucks along the single lane access road from the mine to coastal Labrador, either to Vale’s existing facility in Anaktalak Bay (Option A) or in Voisey’s Bay (Option C), and then by ships to a rare earth separation plant that will be located in Sept-Îles. The transport vessel will follow an existing shipping route along the Labrador coast, through the Strait of Belle Isle, along the north coast of the Gulf of St. Lawrence, through the Jacques-Cartier Strait north of Anticosti Island, and finally into the port of Sept-Îles, Quebec (see Map 14-6 for details). The container ships will make 5-10 trips per year from the Labrador coast to Sept-Îles during the open water period (June to October). Shipping is planned for both the construction and operation phases of the mine. Marine traffic is lower on the Labrador coast than in the Gulf and Estuary of St. Lawrence. According to data from the Canadian Coast Guard (CCG, pers.comm.,2024), the Port of Vale is expected to have an average of 55 ship transits (departures + arrivals) per year between 2020 and 2023. In contrast, the Gulf of St. Lawrence is expected to have an average of approximately 4,770 transits per year.

The Torngat Metals transport vessel will operate in compliance with all relevant laws, standards, regulations, and restrictions for the proposed route to reduce risks and cumulative impacts on the marine and coastal environment.

As mentioned in the previous section, three main types of cargo will be shipped to and/or from Torngat Metals' operations and will transit to port facilities depending on the option selected for the single lane road access at the new container storage and handling facilities: concentrate in superbags and containers, fuel and raw materials/general cargo mainly in containers. The latter would include incoming supplies such as food, chemicals used in the flotation process and in the water treatment, consumables used for machinery and facility maintenance, material, equipment and outgoing waste, other excess materials, and any equipment no longer in use.

The concentrate will never be transported in bulk. The transportation will be carried out in accordance with the requirements of the *Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM)* (Health Canada, revised 2011).

9.4.1 Port Facilities and Container Storage and Handling Facilities on Eastern Labrador Coast

Option A Single Lane Access Road – Vale's existing port facility

Option A for the marine shipping route is the existing Vale port located at the entrance of Edwards Cove on the south shore of Anaktalak Bay along the Labrador coast, approximately 25 km southwest of the town of Nain. The Vale port is currently used year-round for industrial transportation of mineral concentrates extracted from their mining complex, Voisey's Bay Labrador Operations, located 10 km south of the port.

Since an agreement is not yet in place with Vale at the time of issuing the present document, this description is based on assumptions. Torngat Metals would lease space from the Port owner and would include in the agreement all infrastructure upgrades and services required. Torngat Metals would fully comply with existing Indigenous agreements in force in relation with this Port.

The infrastructure upgrades at the Port would include:

- Container storage area (capacity : 10,000 to 12,000 containers)
- Container crane
- Other storage facilities (to be confirmed by the feasibility study and the agreement with the owner): fuel storage tank with spill containment, warehouse.
- No work will be done in or near the water, and no terminal expansion or modification is required.

Port operations will be contracted either directly by Torngat Metals, or Port owner, or to local Indigenous owned businesses.

Option C Single Lane Access Road- New Port Facilities in Voisey's Bay

Option C for the shipping route would begin at Voisey's Bay, which is located approximately 20 km south of Anaktalak Bay along the Labrador coast. The southwestern part of Voisey's Bay is considered currently for the potential new port facilities.

New port facilities in Voisey's Bay would need the previously identified components (Vale's option), but also a floating dock. The preferred option, if feasible and acceptable, is to have the container ship equipped with a crane docking directly at the quay. Alternatively, containers could be loaded onto barges, which would then be towed to the container ship moored in deeper water. Actual layouts and alignments all subject to survey and access areas but would need to account for 10,000 to 12,000 containers. Additional infrastructures would include one maintenance workshop, one worker camp including a canteen and medical area, as well as a fuel tank farm that will be refuelled from sea from a rigid pipeline. As mentioned in Section 9.2.15, it is estimated that the tanks at both mine site and port facilities will have a total capacity of 120-150 million litres, but the exact volume at each site will be determined as part of the feasibility study and impact assessment. The fuel will be stored above ground bunded API 650 column supported flat roof storage tanks or alternatively self-contained storage tanks will be used.

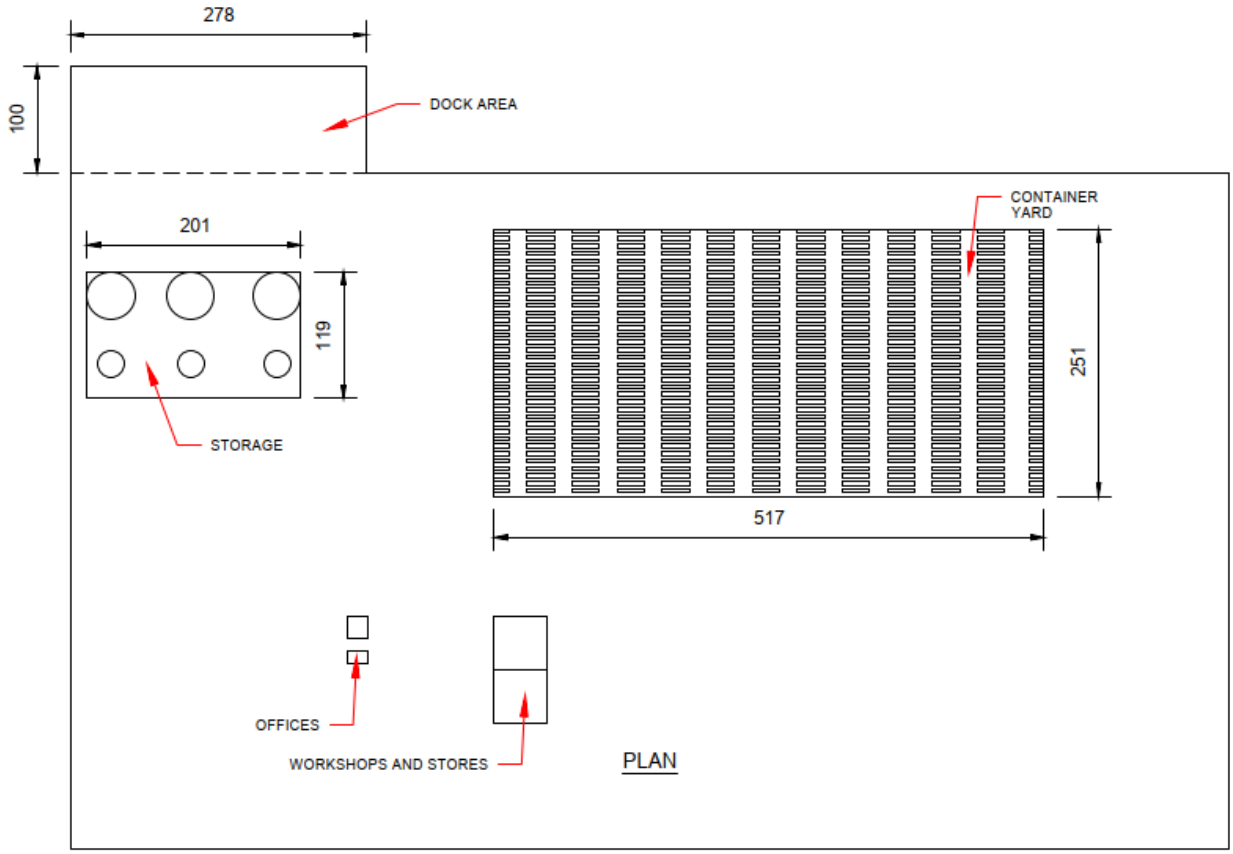


Figure 9-3: Preliminary design for new port facilities in Voisey's Bay

9.4.2 Transportation by Ships

Option A Single Lane Access Road – Vale's existing port facility & Option C Single Lane Access Road- New Port Facilities in Voisey's Bay

The current estimate of the number of shipments by container ships from the eastern coast of Labrador to Sept-Îles Port is the following:

- 5 to 10 shipments per year for concentrate/container shipments, 3 to 5 ships per year for fuel/tanker ships, for a total of 8 to 15 ships per year, during the summer period (during the open-water period, approximately June to October);
- 30 kt payload per shipment (approximately 1,000 containers per shipment).

As previously mentioned, the increase on maritime transportation will be considered in the cumulative effects of the project. As stated above, Marine traffic is lower on the Labrador coast compared to the Gulf and Estuary of St. Lawrence. The Port of Vale is expected to have an average of 55 ship transits per year between 2020 and 2023, according to data from the Canadian Coast Guard (CCG, pers.comm.,2024). In contrast, the Gulf of St. Lawrence is expected to have an average of approximately 4,770 transits per year. As stated above, the Torngat Metals transport vessel will operate in compliance with all relevant laws, standards, regulations, and restrictions for the proposed route to minimize risks and cumulative impacts on the marine and coastal environment, as well as coastal

communities. The number of vessels related to this project could be up to 15 (concentrate/container ships + fuel/tanker ships) per year, in addition to current maritime traffic, which represents about 3 to 4.5%[7] of the total annual maritime traffic along the Labrador coast, and approximately 0.3%[8] of annual maritime traffic along the St. Lawrence River. Should Option C be carried forward, the new maritime route leading from the dock to the existing maritime route will undergo an environmental assessment.

The potential shipping route is described and illustrated in Section 14 (see Map 14-6). The transit time between both Ports would be approximately 10 days.

9.5 Rare Earth Separation Plant (Sept-Îles)

Torngat Metals plans to set up a rare earth Separation Plant in Sept-Îles to receive and process the concentrate produced at the mining site. This separation plant will be sized and optimized for the feed that will be extracted from the B-Zone of Strange Lake. The maximum daily capacity of this separation plant would be approximately 1,000 tonnes of concentrate per day and up to 200,000 tonnes of concentrate per year. It would produce between 2,800 and 3,200 tonnes of separated rare earth oxides (REO) per year, as well as 12,000 to 17,000 tonnes of mixed rare earth carbonates per year. It will also produce 40,000 tonnes per year of ammonium nitrate (NH_4NO_3 77%) as a by-product, which can be sent to the fertilizer market. However, these capacities are preliminary at this stage and will be determined by the pre-feasibility and feasibility studies to be carried out for this facility.

The separation plant and its residue stockpile area would be built in the “Parc industriel ouest – Jonction Arnaud” (also known as “Parc Industriel Vigneault”) of the Sept-Îles industrial port facility (QC), as shown on Map 9-8. The alternatives considered for the selection of this site and the reasons for its choice are described in Section 12.1 – “Alternatives for carrying-out the project“.

9.5.1 Receipt of Concentrate and Other Raw Materials at Port and Transport to Plant

In terms of Port infrastructures, there are two Port areas potentially available for Torngat Metals’ shipping needs, which are Pointe-aux-Basques (east of the bay) and Pointe-Noire (west of the bay). Both can be used for freight and are linked to the Jonction-Arnaud industrial park by rail. At this stage, the preferred option would be to use Pointe-Noire gateway and transport the closed containers of concentrate to the separation plant by using the existing SFPPN rail (see Map 9-8).

Torngat Metals will negotiate contracts with Sept-Îles Port authorities and the operator of the rail which will manage operations and make the necessary adjustments to their installations, if required.

[7] According to Canadian Coast Guard data, between 335 and 482 ship transits per year have been recorded in the Strait of Belle Isle from 2019 to 2023.
[8] The average number of ships travelling on the St. Lawrence River is a dozen per day or 5,000 per year (St. Lawrence 2011-2026 Action Plan. (2017).

9.5.2 Separation Plant

The separation plant would be built in the “Parc industriel ouest – Jonction Arnaud” of the Sept-Îles industrial port facility (QC), also known as ‘Parc industriel Vigneault”. Further details on localization are provided in Chapter 13.

The separation plant will include the following general areas / infrastructures:

- Freight offloading facility
- Concentrate and raw material storage areas (inside buildings or in closed tanks, depending on the product)
- Sulfation area
- Hydrometallurgical area
- Water Treatment Plant
- Process Residue Stockpile Area (see next section)
- Water Collection Basin(s)
- Administration, workshops, warehouse, electrical substation
- Parking and landscaping

The Figure 9.4 presents the general layout of the plant site. The processes are described later in Section 10.3. No effluent discharges are expected during normal operations. Any effluent originating from upsets to the separation process will be directed to a contact basin, treated and returned into the process plant. However, a discharge point for treated water into the Rivière au Foin is provided for cases where surplus treated water cannot be stored and reused at 100% (see later at Section 24.3).

9.5.2.1 Separation Plant Water Supply

Three options are currently being considered for process water supply:

1) from Rivière au Foin: since this is a small watershed, draw would have to be very progressive;
2) by drawing from the stormwater runoff and snowmelt water;
3) trucked in from off-site: the preferred off-site location would be the at the treated water outlet of the wastewater treatment plant (preferred option – to be evaluated as part of the FS and ESIA).

The reserve/inventory of water is established at 10,000 m³. In terms of quantity, the aim is to recycle as much water as possible and to have a closed process where virtually all the water is retained. The discharge of the separation plant will be captured, treated and used for daily makeup water for the plant, with limited make-up water anticipated. Should there be a plant upset, and a need for extra water, Torngat Metals would prioritise the stormwater of the town or the treated sewage effluent of the town, according to what is feasible.

It is expected that drinking water needs would be supplied by the city of Sept-Îles.

9.5.3 Process Residue Stockpile Area

The materials making up the residues will be removed in two sequentially arranged impurity removal stages where oxides such as iron and aluminum are separated, and the excess acid is neutralized by magnesium oxide. Uranium will be removed in a dedicated ion exchange resin unit and will be mixed with the rest of the impurities and sent to residue storage.

At this stage, it assumed that the residue storage area will be located on the same site as the plant, on the eastern side. However, different options will be evaluated and compared as part of the prefeasibility and feasibility studies and in the context of the impact assessment. A discussion of alternative sites is included in the Section 12.1.

The residues from the separation plant could be permanently stored in a dry stockpile. Dry stacking of residue is an increasingly common management strategy where residues are dewatered and filtered to produce a dry cake, which has moisture contents well below saturation. Cement mixture of 5-10% (mass of total residue) is added to the residue material in order to assist with the binding and stability of the stored material. The advantages of dry residues include more efficient use of water, low seepage losses from the dry stack, the ability to progressively reclaim the residue storage facilities, increased physical stability, reduced containment requirements, and simpler water management procedures.

The total volume of the dry stack would be reached at the end of Strange Lake mine operation and is estimated at approximately 5 million tonnes. The total surface area required for the storage of the separation residues is preliminarily estimated at 0.4 – 0,6 km^2.

Residue storage facilities are engineered structures that specifically target the prevention of seepage. The site will be prepared in such a way as to ensure appropriate draining of the minimal seepage that is expected to occur. This could consist of installing a doubled waterproof lining and drainage layer below the stacked residue storage stockpile or other engineered lining to be evaluated as part of the feasibility study.

In order to minimize the potential environmental impact, and subject to the approval of the authorities, the residues will be thickened, filtered and mixed with a cementing agent before being deposited in the residuals management area. The dry residue will be covered progressively as they are accumulated. Daily visual inspection of the cover will verify compliance of each new layer of residue and confirm the integrity of the waterproof covering. Any damage leading to water infiltration will be immediately repaired, or a temporary abatement measure will be applied until permanent repair can be done. Sensors will also monitor any seepage from the dry residue. Collection ditches surrounding the residue stockpile will ensure that the minimal seepage from the residue piles will be directed to a collection basin. The collected water will be added to the process water system.

Addition of cement powder helps with the stability of the residue and leaching mitigation. Generally, cemented backfill are inert, however, seepage and kinetic studies will be performed in order to determine the percentage of cement to be used (expected to be between 5 – 10%), the potential for long-term metal leaching and the potential source terms to be added in the water quality model.

Additional geochemical and geotechnical studies will be conducted in order to inform the design of the mine residue stockpile area and the retention basin that will be used for sedimentation and/or retention for associated water treatment. At this stage of project development, geochemical characterization of the residues from the separation plant are currently being planned. Optimization of the separation process is underway, and no residues are currently available. As soon as a sufficient quantity of residue from the pilot plant is available, their characterization will be carried out in accordance with the *Directive pour la réalisation d'une étude d'impact sur*

l'environnement issued by the MELCCFP for the Sept-Îles separation plant (MELCCFP, Novembre 2023g), the *Guide de caractérisation des résidus miniers et du minerai* (MELCC, June 2020). The residues will be classified and managed according to *Directive 019*.

The environmental design to ensure groundwater protection and the wastewater treatment will be developed based on the results of the geochemical characterization, *in-situ* conditions and Québec's *Directive 019* (MDDEP, 2012).

No effluent discharges are expected during normal operations. Any effluent originating from contact water from the residues due to extreme weather events will be directed to a collection basin, treated and returned into the process plant. However, a discharge point for treated water into the Rivière au Foin is provided for cases where surplus water cannot be reused at 100% (see later at Section 24.3).

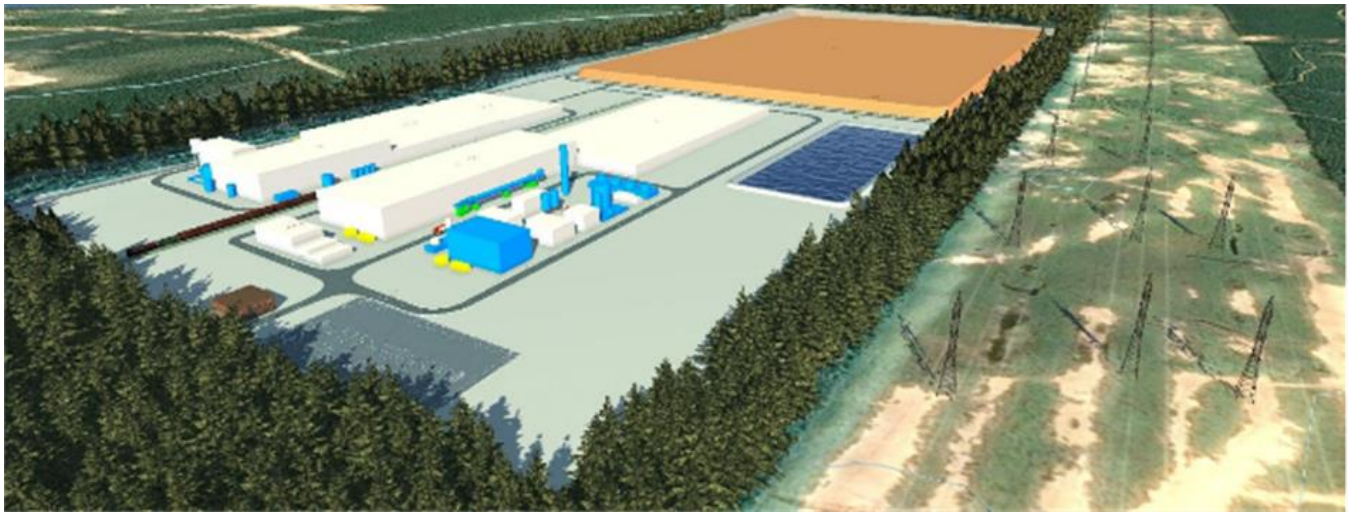


Figure 9-4 : Overview of the separation plant site and of the residue storage area in Sept-Îles

9.5.3.1 Long-Term Management of Process Residue

In view of the concerns raised in this regard, Torngat Metals is committed to examining possible storage alternatives that would allow for future exploitation of the stored residues. Torngat Metals will explore and evaluate the feasibility of future recovery methods that can be foreseen at the design stage, as part of the handling optimization options. These methods must meet applicable regulatory requirements and not compromise storage safety.

9.6 Possible Activities Under the Responsibility of Third Parties

Torngat Metals is very interested in potential related projects that could add environmental and social benefits to its operations, particularly with respect to renewable energy generation and lower-impact alternative transportation methods. However, since Torngat Metals does not have the expertise or control over the development of such projects, it has been decided not to include them as options in this project. Torngat Metals would still like to mention its interest in collaborating with potential third-party developers.

9.6.1 Renewable Energy Production at Mine Site

As mentioned previously, power requirements at the mine site are estimated to be between 15 and 25 MW (most likely around 20 MW) for all operations including the needs at the concentration plant. Since there's no power grid nearby, Torngat Metals will build and operate an onsite power plant based on diesel generators and potentially use geothermal energy to reduce the use of fossil fuels as much as possible. In addition, Torngat Metals is also interested in purchasing energy from third-party renewable energy projects. To this end, Torngat Metals is open to proposals from third-party developers and, if appropriate, could become a partner in such a project insofar as studies demonstrate the environmental and social benefits.

At this stage, Torngat Metals considers renewable energies for energy production at the mine, up to 25%.

9.6.2 Transportation by Hybrid Airships

Torngat Metals is following closely the final stages of development of the hybrid airship technology and might consider the possibility to ship the containers of concentrate by cargo airship when this technology becomes commercially available and authorized. However, this technology is not yet available, and its development is not under Torngat Metals control. Should the technology become available and if its promoter has obtained all the necessary authorizations, Torngat Metals could evaluate this transport option, make sure all compliance requirements would be met and, if deemed appropriate, negotiate with the supplier(s) involved (see also Section 12.1.10).

9.7 Health, Safety and Environmental Management Policy

Torngat Metals is committed to ensuring the health and safety of all personnel, contractors, suppliers and the communities and environment within which they operate. As part of their Health, Safety and Environmental Management initiatives, Torngat Metals will fulfil all statutory HSE requirements, including employer “duty of care” obligations. Torngat Metals’ Health and Safety Policy relies on the individual commitment of each employee to ensure that safety standards are upheld at all times. All Torngat Metals personnel, subcontractors and suppliers must adhere to the following guidelines:

9.7.1 Site-Specific Training Requirements

Torngat Metals will develop and implement educational and training tools to ensure all administrative and operational personnel have the appropriate knowledge and training to adhere to their HSE policies. Torngat Metals will:

- Develop site-specific training programs tailored to the conditions and risks of each location.
- Ensure that all personnel, subcontractors, and suppliers receive training relevant to their roles and responsibilities.
- Regularly update training modules to incorporate new information and best practices.

9.7.2 Emergency Spill Response

In the event of an accidental release within the environment on any of Torngat Metal’s sites, personnel will:

- Maintain a detailed spill response plan outlining containment, cleanup, and reporting procedures.
- Conduct regular spill response drills to ensure readiness and familiarity with protocols.
- Utilize advanced spill prevention technologies and practices to minimize the likelihood of spills.

9.7.3 Incident Response Protocols

In the event of any incident, our priority is to swiftly respond, mitigate impacts, and safeguard personnel. Our approach includes:

- Clear communication lines to promptly report incidents and activate response teams.
- Trained emergency response teams equipped with appropriate equipment and resources.
- Regular review and enhancement of incident response procedures based on lessons learned.

9.7.4 Evacuation Procedures

Safety is paramount, and our evacuation procedures are designed to protect everyone involved. We will:

- Establish evacuation routes and assembly points, regularly communicated to all personnel.
- Conduct evacuation drills to ensure familiarity with procedures and safe assembly.
- Collaborate with local authorities to ensure coordinated and effective evacuation efforts.

9.7.5 Risk Management Practices

To proactively address potential risks, our risk management practices encompass:

- Development of a Human Health Risk Assessment prior the commencement of operations to proactively determine potential risk sources and inform safety protocols.
- Comprehensive risk assessments conducted before commencing operations and regularly thereafter.
- Implementation of engineering controls, administrative measures, and personal protective equipment to mitigate identified risks.
- Continuous monitoring and review of risks, with adjustments made to procedures and protocols as needed.

9.7.6 Safety Commitments Towards Employees and Community Members

Our commitment to safety extends beyond our workforce to the communities we engage with. We pledge to:

- Provide comprehensive health and safety training to employees, contractors, and community members.
- Collaborate with local communities to develop culturally sensitive safety programs and initiatives.
- Regularly engage with community members to address concerns and improve safety measures.

9.7.7 Regulatory Compliance

We are committed to upholding all relevant laws, regulations, and standards governing health, safety, and environmental protection. Our efforts include:

- Regular audits to ensure compliance with local, regional, and national regulations.
- Continuous training to keep our workforce informed about evolving regulatory requirements.
- Collaboration with regulatory authorities to maintain open communication and ensure mutual understanding.

We understand that the success of our operations depends on a healthy and safe environment. This policy is an ongoing effort, subject to continuous review and improvement to ensure the highest standards of health, safety, regulatory compliance, and site-specific training. By adhering to these principles and working together, we can create a safer and more sustainable future for all.

9.8 Employment and Workforce

9.8.1 Construction

Upon the prefeasibility and feasibility studies, detailed engineering design will be more precise and workforce required for construction established. Thus, workforce will be presented in the EA, based on the National Occupational Classification (NOC, 2021). Torngat will hire an EPC Contractor to oversee all construction, including the mine site, the road and the plant site. Therefore, a precise estimate of the workforce is not available at the present time. For now, Table 9-2 outlines the estimated workforce by occupational classification groups and duration. Table 9-3 details the estimated contract labor force for civil, structural steel, mechanical and platework, piping, electrical, instrumentation and control, with a likely peak of 1000 workers.

Table 9-2: Estimated workforce during the construction (number per occupation classification and duration)

Estimated Torngat During Construction	Peak	Duration
	nr.	mths.
Construction Environmental Monitoring	4	24
Construction Management	2	25
Health and Safety	8	25
Civil Engineering	4	25
Structural Steel	6	15
Mechanical and Platework	6	15
Piping	6	13
Electrical, Instrumentation and Control	6	13

Table 9-3: Estimated contract labour for the construction (peak number, duration)

Estimated Construction (Contract Labour) Force	Peak	Duration
	nr.	mths.
Civil	150	24
Structural Steel	250	14
Mechanical and Platework	300	14
Piping	450	12
Electrical, Instrumentation and Control	400	12
Likely Peak	**1000**	

9.8.2 Operations

During the operation phase, it is estimated that the total workforce will be approximately 428 equivalent full-time workers considering full-time (most of the jobs) and part-time positions. Table 9-4 details the departments, the positions, and number of people required.

It will be divided as follows:

- 203 equivalent full-time workers in the North for the mine site, including road, supply chain and assay lab;
- 190 equivalent full-time workers in Sept-Îles at the separation plant;
- 35 equivalent full-time workers for corporate.

The total annual wages and benefits costs for the total workforce is estimated to be $93,700,000 or an average annual income of $161,000.

9.8.3 Equity, Diversity and Inclusion

Torngat Metals understands the importance of having a diverse, equitable, and inclusive workforce that is better able to respond to challenges, attract top talent, and accomplish the Company's business goals, by benefiting from diverse backgrounds and experiences. Torngat Metals is committed to creating a working environment that provides all employees, particularly groups that have been historically underrepresented, with the opportunity to achieve their personal career goals in a fair and just manner, while fostering a culture of belonging and integration. These groups include, but are not limited to, Indigenous peoples, women, persons with disabilities, and visible minorities.

Table 9-4: Workforce during the operations for all department and project components (mine, road, separation plant)

Department	Position	# of People Required	Full-time Positions	Part-time Positions	Equivalent Full-time
CORPORATE	Chief Executive Officer	1	1	0	1
	Chief Financial Officer	1	1	0	1
	Chief Marketing Officer	1	1	0	1
	VP Environment	1	1	0	1
	VP Human Resources	1	1	0	1
	VP Finance	1	1	0	1
	VP Community Engagements & Partnerships	1	1	0	1
	VP Project Management	1	1	0	1
	VP Sales & Marketing	1	1	0	1
	VP Separation Plant	1	1	0	1
	VP Mining	1	1	0	1
	HR Generalist	1	1	0	1
	HR Specialist	1	1	0	1
	Bilingual Recruiter	1	1	0	1
	Director of Corporate Accounting	1	1	0	1
	Corporate Accountant	1	1	0	1
	Manager Financial Reporting & Analysis	1	1	0	1
	Payroll Manager	1	1	0	1
	Accounts Payable Clerk	2	2	0	2
	Office Manager & Executive Assistant	1	1	0	1
	IT support	2	2	0	2
	Environment Staff	1	1	0	1
	Fire Captain (Mill)	1	1	0	1
	HS & E General Foreman	1	1	0	1
	Safety Advisors	1	1	0	1
	Elder	1	1	0	1
	Security Officer	3	3	0	3
	Social Worker	1	1	0	1
	Safety Controller	1	1	0	1
	Paramedic	2	2	0	2
MINE	Apprentice	1	1	0	1
	Blaster	1	1	0	1
	Blaster Assistant	1	1	0	1
	Drill Operators	1	1	0	1
	Environment Monitors (Mine & Port)	1	1	0	1
	Environmental Engineer	1	1	0	1
	Fire Captain (Mine & Port)	1	1	0	1
	General Labourer	1	1	0	1
	Grade Control Technicians	1	1	0	1
	Haul Truck Drivers	1	1	0	1
	Heavy Equipment Mechanics	1	1	0	1
	Helpers (Water Supply) – Mine	1	1	0	1
	Incinerator / Landfill Operator	1	1	0	1
	Inspectors / Radiation Techs (Mine & Port)	1	1	0	1

Table 9-4: Workforce during the operations for all department and project components (mine, road, separation plant) (Cont'd)

Department	Position	# of People Required	Full-time Positions	Part-time Positions	Equivalent Full-time
MINE (cont'd)	Light Equipment Mechanics	1	1	0	1
	Loading Operators	1	1	0	1
	Lubeman	1	1	0	1
	Maintenance Foreman (Mine)	1	1	0	1
	Mine Engineer	1	1	0	1
	Mine Geologist	1	1	0	1
	Mine Operations General Foreman	1	1	0	1
	Mine Trainer	1	1	0	1
	Paramedics (Mine)	1	1	0	1
	Pipefitter (Water Supply) - Mine	1	1	0	1
	Potable Operator	1	1	0	1
	Security Officer (Mine)	1	1	0	1
	Senior Geologist	1	1	0	1
	Senior Mine Engineer	1	1	0	1
	Sewage Operator	1	1	0	1
	Support Operators	1	1	0	1
	Surveyors	1	1	0	1
	Tireman	1	1	0	1
	Warehouse Attendant	1	1	0	1
	Water Supply - Senior Technologist (Mine)	1	1	0	1
	Water Treatment Operator	1	1	0	1
ROAD	Road Truckers	14	14	0	14
	Bus Driver / Ambulance Driver	2	2	0	2
	Airport Lead / Freight and Passenger	2	2	0	2
	Airport Technician / Signal	2	2	0	2
	Forklift Operator / Inventory Technician	2	2	0	2
	Helpers – Transportation	2	2	0	2
	Truck Trainers	1	1	0	1
	Clerks	2	2	0	2
ROAD MAINTENANCE	Grade Operator	1.5	1	0.5	1.5
	Snow Plough Operator	1.5	1	0.5	1.5
	Yard Loader	1.5	1	0.5	1.5
	Snow Blower / Excavator / Soil operator	1.5	1	0.5	1.5
	Helpers	4	4	0	4
	Road Safety Drivers	2	2	0	2
	Transportation & Airport Foreman	2	2	0	2
	Road Maintenance Foreman	2	2	0	2
	Mine Camp Foreman	2	2	0	2
	Planner / Dispatcher / Inventory	2	2	0	2
	Clerks	2	2	0	2
	Attendant Generator / Conveyor	3	3	0	3
	Attendant Tank Farm	3	3	0	3

Table 9-4: Workforce during the operations for all department and project components (mine, road, separation plant) (Cont'd)

Department	Position		# of People Required	Full-time Positions	Part-time Positions	Equivalent Full-time
SUPPLY CHAIN	General Foreman		1	1	0	1
	Transload Supervisor - Port		1	1	0	1
	Transload Supervisor – Mills		1	1	0	1
	Forklift Drivers		2	2	0	2
	Clerks		1	1	0	1
	IT Manager		1	1	0	1
	IT Assistant		1	1	0	1
	Planner / Dispatcher – Port		1	1	0	1
	Procurement Manager		1	1	0	1
	Inventory Lead		1	1	0	1
ASSAY LAB	Head of Laboratory		1	1	0	1
	Clerks		1	1	0	1
	Sulphation Chemists		8	8	0	8
	Hydromet / Effluent Chemists		8	8	0	8
	Separation Chemists		6	6	0	6
	ICP (MS) Specialists		4	4	0	4
CONCENTRATION PLANT	CRUSHER	FEL Operator	4.16	4	0.16	4.16
		Crusher Operator	4.16	4	0.16	4.16
	XRAY SORTING	Operator	4.16	4	0.16	4.16
	SECONDARY CRUSHING / WET MILLING / GRINGING – 1ST STAGE	Grinding Mill Operator	4.16	4	0.16	4.16
		Milling FEL Operator	4.16	4	0.16	4.16
		Crane Operator	1	1	0	1
		Plant Technician	1	1	0	1
	MAGNETIC SEPARATION	Operator	4.16	4	0.16	4.16
	WET MILLING – 2nd STAGE	Operator	4.16	4	0.16	4.16
	FLOATATION / CONCENTRATION	Operator	8.32	8	0.32	8.32
		Maintenance	4.16	4	0.16	4.16
	THICKENING & FILTRATION	Filtration Operators	4.16	4	0.16	4.16
	MAINTENANCE LABOUR	Maintenance Foreman	1	1	0	1
		Millwright	4.16	4	0.16	4.16
		Carpenter	4.16	4	0.16	4.16
		Pipefitter	4.16	4	0.16	4.16
		Welder Piping	4.16	4	0.16	4.16
		Electrician	4.16	4	0.16	4.16
		Technician Instrumentation	4.16	4	0.16	4.16

Table 9-4: Workforce during the operations for all department and project components (mine, road, separation plant) (Cont'd)

Department	Position		# of People Required	Full-time Positions	Part-time Positions	Equivalent Full-time
SULPHATION	MANPOWER - OPERATIONS	Head of Sulphation	1	1	0	1
		Metallurgist Engineer	1	1	0	1
		Technology Engineer	1	1	0	1
		Chief Foreman	1	1	0	1
		Mill Trainer	4	4	0	4
		Mill Foreman	4	4	0	4
		Mixing Section Operators	8	8	0	8
		FB Section Operators	8	8	0	8
		Leaching / Filtration Operators	8	8	0	8
		Relief Operators	8	8	0	8
		Control Room Operators	4	4	0	4
		Process Control Technologist	4	4	0	4
		Transport & Logistics	8	8	0	8
		Sampler	4	4	0	4
	MANPOWER – MAINTENANCE	Head of Maintenance	1	1	0	1
		Maintenance Planner	1	1	0	1
		Data Entry Clerk	1	1	0	1
		Maintenance Foreman	1	1	0	1
		First Line Maintenance	8	8	0	8
		Millwright	2	2	0	2
		Carpenter	2	2	0	2
		Pipefitter	2	2	0	2
		Welders	2	2	0	2
		Brick Layers	2	2	0	2
		Electricians	2	2	0	2
		Technician Instrumentation	2	2	0	2
		Process Control	2	2	0	2
HYDROMET & SEPARATION	MANPOWER - OPERATIONS	Head of Hydromet & Separation	1	1	0	1
		Metallurgist Engineer	1	1	0	1
		Technology Engineer	1	1	0	1
		Chief Foreman	1	1	0	1
		Operators	4	4	0	4
		Hydromet Operators	12	12	0	12
		Thickening / Filtration Operators	8	8	0	8
		Calcining Operators	8	8	0	8
		Relief Operators	12	12	0	12
		Control Room Operators	4	4	0	4
		Transport & Logistics	12	12	0	12
		Samplers	4	4	0	4

Table 9-4: Workforce during the operations for all department and project components (mine, road, separation plant) (Cont'd)

Department	Position		# of People Required	Full-time Positions	Part-time Positions	Equivalent Full-time
HYDROMET & SEPARATION	MANPOWER – MAINTENANCE	Maintenance Superintendent	1	1	0	1
		Maintenance Planner	1	1	0	1
		Data Entry Clerk	1	1	0	1
		Maintenance Foreman	1	1	0	1
		First Line Maintenance	8	8	0	8
		Millwright	2	2	0	2
		Carpenter	2	2	0	2
		Pipefitter	4	4	0	4
		Welders	2	2	0	2
		Maintenance Filters	2	2	0	2
		Electricians	2	2	0	2
		Technician Instrumentation	2	2	0	2
		Process Control	2	2	0	2
TOTAL			**428**	**423**	**4.72**	**428**

10 Production Process and Capacity

10.1 Life of the Mine and Mining Operations

The total amount of material mined over 30 years is estimated at 195,300,000 tonnes (dry basis). The quantity of material extracted annually will be of the order of 5 - 13 million metric tonnes. Mining will be carried 12 months per year. The amount of material mined annually could vary significantly, however, as the mining strategy is to mine as much material as possible in the first 18 years, in order to first process the resource containing a higher concentration of the desired elements (high-grade resource), and to stockpile the lower-grade resource for further processing in the remaining 12 years. Thus, it is currently planned that substantially all of the material will be mined during the first 18 years of mine operation, at a rate of 5.0 to 13.0 million metric tonnes per year.

The maximum quantity of material mined per day at any time over 30 years of operation is 36,000 tonnes per day.

The mined high-grade material coming out from the pit (first 18 years) or the low-grade material coming from the low-grade stockpile (last 12 years) is trucked to the primary crusher where is it crushed under dry conditions into rocks of less than 100 mm in diameter (dry comminution process). From there it is conveyed (covered conveyor) to an enclosed dome stockpile, and then fed into the concentration plant.

10.2 Rare Earth Concentration Plant & Process (mine site)

The concentration plant would be fed with high grade resource for the first 20 years at a rate of between 2.25 and 3.0 million tonnes per year. For the remaining 12 years, the mill would be fed with lower grade stockpiled resource at a average rate of 6.0 million tonnes per year. The concentration processes that will be used in the concentration plant are currently being optimized. Although process variants are still under review and could alter the exact sequence of operations, the sorting and concentration processes will include the following main steps:

- Fine grinding (in a wet environment): the rocks from the primary crushing process are subjected to a fine grinding (less than 300 µm) carried out in a wet environment to avoid airborne emissions of fine particles. This is achieved by a Semi-Autogenous Milling (SAG) with a closed-circuit pebble crusher. At this stage of concentration process development, there is a potential option to include an X-ray sorting (dry process) upstream of the fine grinding. If retained, the coarse fraction would first be routed to an X-ray scanner which allows the rocks to be separated according to their atomic density. This step would help separate the rocks containing sufficient resource and from the waste rocks (gangue), essentially made up of quartz. This option will be evaluated as part of the feasibility study. For now, the geochemical characterization program (see Section 9.2.1 and Appendix D) considers the rejected fraction from X-Ray sorting would be characterized separately, if applicable.
- Magnetic separation (wet): the milled product is then subjected to concentration by Wet High Intensity Magnetic Separation (WHIMS). At the start of the process, a Low Intensity Magnetic Separator (LIMS) removes the iron bearing particles, which are sent to waste rock pile. Then the first stage of WHIMS at low field strength cleans the material from hematite and aegirine (ferro-magnetic fraction), which are sent to the mine residue dry stockpile (or dry stack). The second stage of WHIMS is at high field strength and cleans the material containing the bulk of the rare earths from the non-magnetic material (feldspath, quartz), which is also sent to the mine residue dry stockpile.
- Re-grinding: the concentrate intermediate product is then re-ground to approximately 45 µm in a ball mill, to free the valuable elements from their gangue in order to assist in separation during the flotation process.

- Flotation: the resulting slurry is pumped into tanks called flotation cells. The finely ground material is first conditioned with chemicals and heated to 50-60 degrees temperature. The process consists in selectively floating the finely ground material suspended in water by means of a foam formed by air injection. The selectivity is ensured by the precise dosing of reagents under very specific conditions. The flotation is carried out in a long series of successive operations before producing the final concentrate. At the present stage of the beneficiation process development, it is planned to use the following list of reagents:
  - Hydroxamate (e.g. Florrea 7510 2%) as collector
  - Na-metasilicate 10% as depressant
  - Mixture of polyglycols (e.g. Oreprep F549 1%)
- Decanting (thickening), filtration, packing: the fraction containing the final concentrate (>10% rare earth) is decanted and filtered to 8-10% moisture before being packed in super-bags and stored for shipping.

The reject fractions from the magnetic separation and flotation processes constitute the concentration processes residues; these residues, generated in a wet environment, are thickened and filtered to approximately 15% moisture before being mixed with cement (5-10% of mass) and then transported to the mine residue stockpile area.

The water from the concentrate and residue decanting and filtration processes is treated, then reused in these same processes. This reuse in close circuit makes it possible to reduce the consumption of freshwater make-up and the prevent mine water discharge as much as possible.

The concentration plant will be designed to operate 12 months per year at a design production rate of 150,000 to 200,000 tonnes of concentrate annually (dry basis), over the 30 years of the project.

Under the current plan, the feed rate of crushed material to the concentrator will vary to prioritize the most accessible high-grade material. Thus, during the first 18 years of operation, the feed rate (mainly high grade) to the concentrator will average in the order of 2.25 to 3.0 million tonnes per year (dry basis). An expansion of the concentration plant (included in this project) will allow processing, during the 12 following years, of up to 6 million tonnes per year of low-grade that has been stockpiled.

It is estimated that in its expanded version, the concentration plant will have the capacity to process up to 17,000 tonnes per day of crushed material.

10.3 Rare Earth Separation Plant in Sept-Îles

Under the current plan, the feed rate of concentrate to the separation plant will vary between 150,000 to 200,000 tonnes per year depending on the rare earth content in the concentrate. It is estimated that the separation plant will have the capacity to process up to 1,000 tonnes per day of concentrate.

As for the Concentration Plant, the processes that will be used in the rare earth separation plant are currently being optimized. Although process variants are still under review and could significantly alter the exact sequence of operations, the processes will include the following main steps:

- Acid baking (sulfation) and calcination: this thermal separation process produces a mixture of rare earths in the form of sulfates, while most of the other elements making up the concentrate ("gangue") are broken down into oxides.
- Water leaching and rare earth separation (hydrometallurgical process): rare earth sulfates are separated and purified through a hydrometallurgical process that involves different stages of precipitations at different pH and temperatures, as well as anion exchanges resins and dedicated solvent extraction steps. Gangue and impurities are separated at various stages of this process and sent to the dry stacking residue storage facility.

10.3.1 Acid Baking (sulfation) and Calcination

The concentrate material is dried and then mixed with sulphuric acid, which heats up the mixture (exothermic reaction). The acid baking is being carried out in an electric furnace. In a second step, the sulfates produced by the acid baking is processed at high temperature in a fluidized bed reactor, where the sulfates of the main elements of the gangue (Fe, Al, Si, Zr, etc.) will be decomposed into oxides, whereas the rare earth elements sulfates won't be decomposed. It should be noted that after this stage, thorium will be predominantly in oxide form, while uranium will remain in sulfate form (crystalline solid state compound), as will the rare earth elements. When hydrated, it often incorporates water molecules into its structure, but the fundamental compound remains solid.

The dry mixture resulting from this firing (or calcination), which contains all these mixed substances at the outlet of the fluidized-bed reactor, is commonly referred to as "calcine", which will be the input to the next purification process (hydrometallurgical process).

Heat exchangers are installed at key stages of the process to recover as much heat as possible and reduce electrical power consumption. The sulphuric acid will also be recovered and reused in the acid recovery system to reduce consumption of fresh sulphuric acid. Torngat Metals estimate that approximately 30,000 t/y of make-up acid would be required, which would either have to be stored on-site or produced on-site in an acid plant. During the pre-feasibility study, it will be determined which option is the most sustainable approach. The acid is stored in tanks made of suitable materials to prevent corrosion. The acid storage tanks are located in bunded areas that can contain 110% of the largest container in case of rupture and then pumped back into the process system. The concrete in these bunds are protected with a acid protective epoxy resins.

Gas emissions will be extracted then treated by a cyclone, followed by lime addition in a scrubber. The calcine dust collected by the cyclone and the gypsum produced by the neutralization of acid gases in the scrubber are recovered for treatment and disposal in authorized facilities.

The simplified diagram below illustrates the main material flows in this first separation stage.

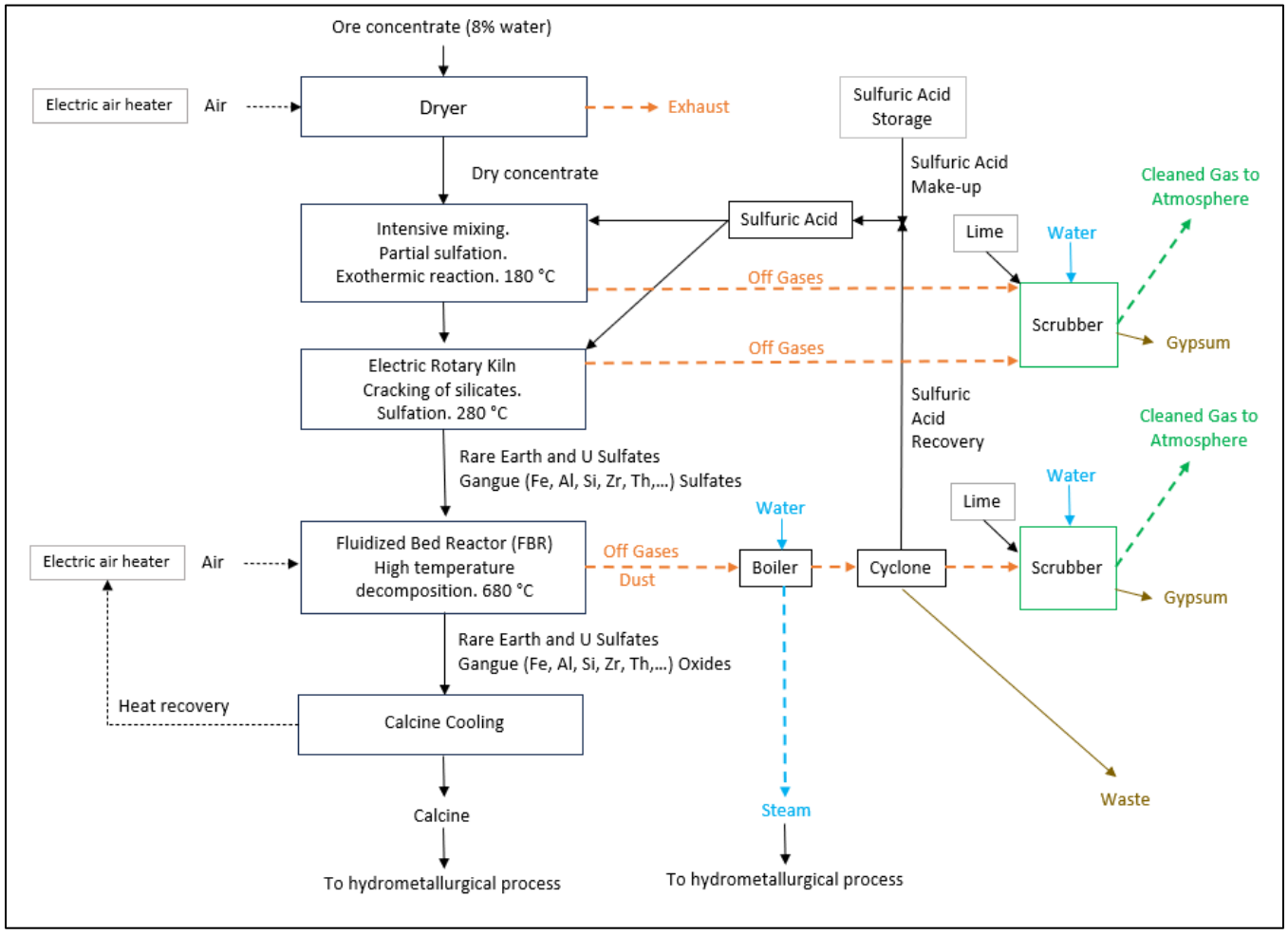


Figure 10-1: Simplified acid baking (sulfation) and calcination process flowsheet-

10.3.2 Water Leaching and Rare Earth Separation (hydrometallurgical process)

The calcine from the acid baking and calcination processes is first mixed with water to dissolve the sulfates, under an acidic pH. This is the first step of the “water leaching process”. The gangue oxides (Fe_2O_3, Al_2O_3, SiO_2, ZrO_2) remain solid and can be separated by thickening and filtration. The sulfate solution, which contains the rare earth sulfates, is then partially neutralized with magnesium oxide, which leads to the precipitation of other impurities that can also be removed and separated by thickening and filtration. The sulfate solution then passes through an ion exchange resin that retains the uranium. The output of the water leaching process is a pure rare earth sulfate solution.

The rare earth sulfate solution is then subject to different stages of precipitations at different pH and temperature and dedicated solvent extraction steps, during which the targeted Light Rare Earths are firstly extracted, and then the targeted Heavy Rare Earths. During these steps, the rare earths sulfates are transformed into less soluble rare earth oxides or carbonates. Ammonium nitrate is also produced as a byproduct. The final products to be sent to the market are:

Light Rare Earth:

- Neodymium and Praseodymium (Nd and Pr) oxide 99,5 %

Heavy and intermediate Rare Earths:

- Dysprosium oxide (Dy_2O_3)
- Terbium oxide (Tb_4O_7)
- Heavy rare earth carbonates mixture
- Mix of intermediate rare earth carbonates including Samarium (Sm) carbonate, Europium (Eu) carbonate and Gadolinum (Gd) carbonate)

By-product: ammonium nitrate (used in fertilizer market) (NH_4NO_3 77%)

The wastewater and the solid residues from the Sept-Iles separation plant are mostly coming from the three separation steps of the water leaching process (two from thickening and one from a filtration and ion exchange). Some wastewater and solid residues are also generated in the Light Rare Earth extraction section, but very few in the heavy rare earth separation section. The wastewater is treated and reused in the process. As such, no effluents are anticipated during normal operations The residues are thickened and filtered before being mixed with cement and sent to a dry stacked storage stockpile, as described in Section 9.2.7.

Atmospheric emissions are also produced in the different steps of the hydrometallurgical process, although significantly less than in the acid baking acid and calcination processes. The atmospheric emissions of the hydrometallurgical process are in general associated with the very last stages of the purification process, such as the drying or calcination steps that are preparing the products in their final state. These processes will be operated in small batches.

The simplified process flow diagram for the hydrometallurgical plant is provided as draft version in the figure 10-2.

At the separation plant in Sept-Îles, the main chemical products that will be used are:

- Sulphuric acid: 98,5% H_2SO_4 solution
- Hydrated lime: $Ca(OH)_2$.
- Nitric acid: 69% HNO_3 solution
- Phosphoric acid: 85% H_3PO_4 solution
- Ammonium hydroxide: NH_4OH (22% NH_3)

Magnesium oxide and peroxide are also used in the water leaching process. Quaternary ammonium salts, such as Aliquat 336, and organic solvents, such as ethyl hexyl phosphonic acid (HDEHP) and its derivatives (PC88A), will also be used in the solvent extraction processes which are used to extract the light and the heavy rare earths from the rare earth solution.

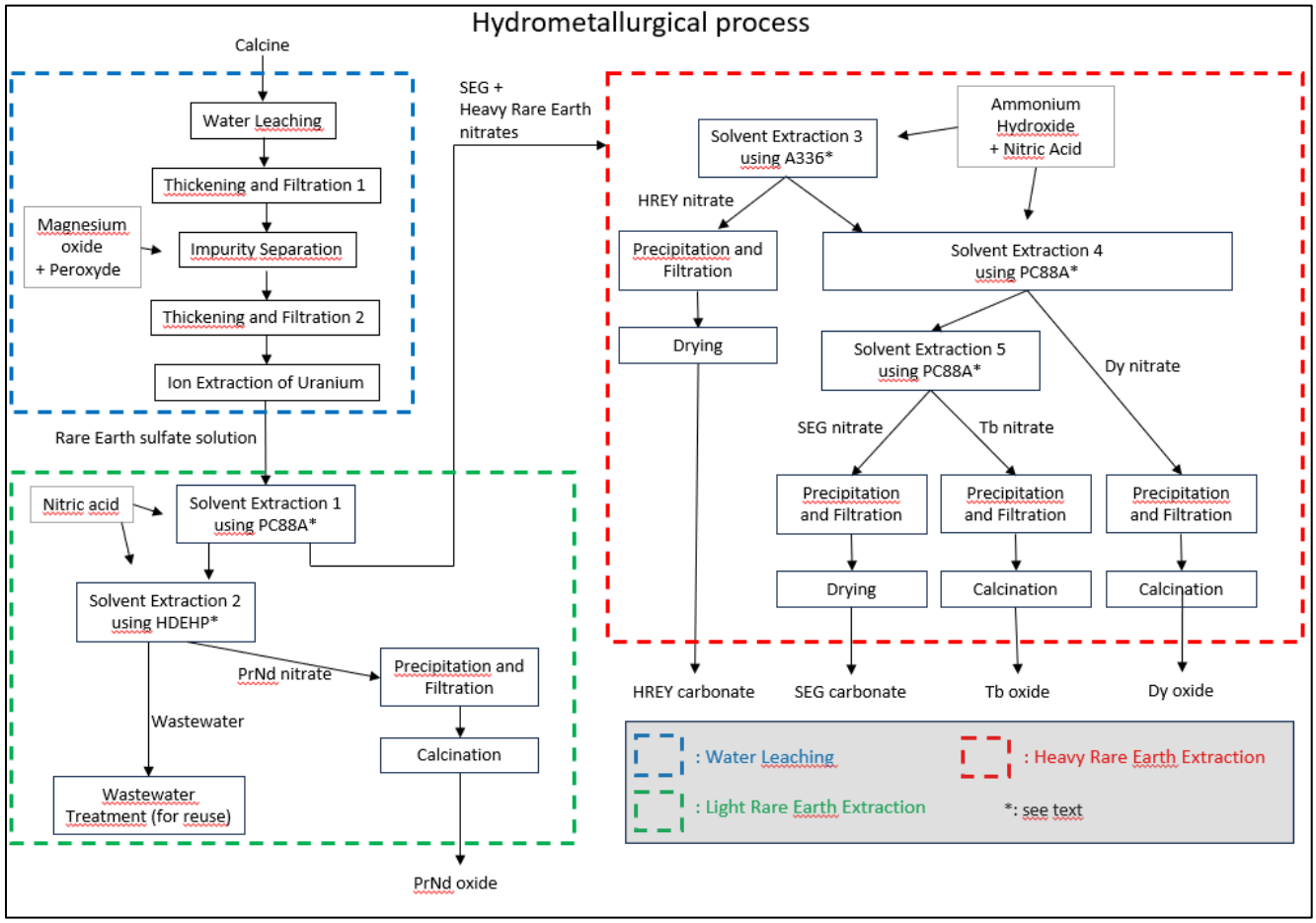


Figure 10-2: Simplified Hydrometallurgical process flowsheet

10.4 Materials Handling

Table 10-1 presents an estimate of the quantities of materials that will be generated by the project (mined material, low-grade, concentrate, waste rock and residues). However, this operating scenario is subject to change based on pilot tests.

Over the project exploitation period, a maximum daily extraction capacity of 36,000 tonnes is estimated. The maximum mill feed at the concentration plant is estimated at 17,000 tonnes/day. The maximum feed at the separation plant is estimated at 1,000 tonnes/day.

Table 10-1: Estimated quantities (dry tonnes) by type of material (30 years of operation) at the Mine, the Concentration Plant, and the Separation Plant sites

Project Site Component	Mining material type	Annual average – Low estimate	Annual average- High estimate	Annual average – Low estimate	Annual average – High estimate	Maximum per day at any time over 30 years	Total over 30 years (Mine life)
		Years: 0 to 18		Years: 19 to 30			
Mine Site and Concentration Plant	Mined material (tonnes)	5,000,000	13,000,000	0	0	36,000	195,300,000
	Mill feed (concentration plant) (tonnes)	2,250,000	3,000,000	6,000,000	6,000,000	17,000	113,250,000
	Overburden & Waste rocks from mining (tonnes) (1)	500,000	1 000,000	0	0	4,200	12,000,000
	Low grade material (tonnes) (stockpiled for future use as feed)	6,000,000	9,000,000	0	0	25,000	70,050,000
	Final Concentrate (tonnes)	150,000	200,000	200,000	200,000	1,000	5,725,000
	Concentrate % rare earth	10%	12%	8%	10%	n/a	n/a
	Mine residues (tonnes) (2)	2,350,000	2,800,000	5,800,000	5,800,000	16,000	107,525,000
Separation Plant (Sept-Îles)	Separation plant feed (tonnes)	150,000	200,000	200,000	200,000	1,000	5,725,000)
	Separated Rare Earth Oxides (tonnes) (3)	2,800	3,200	2,800	3,200	16	93,000
	Other Rare Earth products (4)	12,000	17,000	12,000	17,000	85	449,500
	Residuals (tonnes) (5)	135,200	179,800	135,200	179,800	899	4,882,500

(1): Total overburden: approximately 11,700,000 tonnes. Total waste rock: approximately 300 000 tonnes.

(2): Excluding 5-10% cement added.

(3): Quantity of the 4 rare earth oxides targeted (oxides of neodymium, praseodymium, dysprosium and terbium).

(4): Heavy rare earth carbonates mixture

(5): Excluding residues of chemicals used for processing and 5-10% cement added. The total mass including these would be approximately 10 to 15% higher.

10.5 Radionuclides

The radionuclides naturally found in the Strange Lake deposit are Thorium (Th-228, Th-230, Th-232) and Uranium (U-234, U-235, U-238). More precisely, natural thorium is almost exclusively Th-232 with a small amount of Th-230. Th-228 is a result of the disintegration of Th-232 to Ra-228 and then Ra-228 into Th-228. Descendants of Th-232 emit primarily alpha and beta rays and some gamma rays. U-235 and U-238 are subject to complex disintegration chains (10 and 13 descendants of radionuclides) emitting alpha, beta, and gamma rays before reaching the stable forms of Lead-206 and 208. These series of radionuclides (Th, U) naturally found in the surroundings of the mine site / Lake Brisson have been investigated in surface water in 2023, and their reference levels are available at Appendix F.

The radionuclides naturally found in the Strange Lake deposit are by definition "Naturally occurring radioactive materials (NORM)[9]". These NORM will not be modified at atomic level by either the concentration processes (concentration plant at mine site), the acid baking process or the hydrometallurgical process. Therefore, the natural radioactivity of these elements won't be modified by the processes. Because of their atomic characteristics, both Thorium (Th) and Uranium (U) will mostly follow the rare earth elements in the various processes. Based on a very preliminary mass balance, the various quantities and concentration of Uranium and Thorium that will be at each of the main processing and transport steps are shown in the following table (Table 10-2). The ranges shown are based on the following:

- The highest Th and U concentrations/quantities is typically associated with the highest rare earths' grade of ore, which will be mainly extracted during the first 5 years of mine operation (Y1 to Y5).

The deleterious materials in the concentrate will be removed in two sequentially arranged impurity removal stages at the separation plant in Sept-Îles where oxides such as iron, aluminum are separated, and the excess acid is neutralized by magnesium oxide. Uranium will be removed in a dedicated ion exchange resin unit and will be mixed with the rest of the impurities and sent to residue storage. All the radionuclides will be separated from the rare earths, which explain why the absolute quantities feed at the separation plant will go into the residues, as shown in the two columns at the right of the Table 10-2 (under "quantity ranges"). However, concentrations of Th and U in the residues are reduced compared to their concentration in the concentrate, due to the presence in residues of substances resulting from reactions with acids in the sulfation and hydrometallurgy processes, as well as by the addition of a cementing agent, as shown in the two center columns of the Table 10-2 (under "concentration ranges").

Table 10-2: Concentration and quantity of Naturally Occurring Radionuclides Materials (NORM) at each processing steps

Step	Concentration ranges (ppm)		Quantity ranges (tonne/year)	
	Th	U	Th	U
Material extracted	255 - 960	53 - 278	766 - 1025	159 - 297
Mine residue stockpile (concentration process residue – mine site). Assumption: 5-10 % cement is added	186 - 355	40 - 167	296 - 407	88 - 139
Concentrate transported from mine to separation plant, in superbags and closed containers	1528 - 12632	280 - 1165	257 - 1078	47 – 100
Separation plant residue (Sept-Îles site). Assumption: 5-10 % cement is added	1287 - 10633	236 - 981	257 - 1078	47 - 100

[9] This term is consistent with the definition of the Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM) (Health Canada, revised 2011). NORM include radioactive elements found in the environment.

For disposal of Naturally Occurring Radioactive Material, Torngat will be working within the accepted limits set by Federal and Provincial Governments. Cement will be added to help with the stability of the residue and leaching mitigation. Residue storage facilities are engineered structures that specifically target the prevention of seepage.

Determining the specific activity of radionuclides is crucial for assessing radiation exposure and ensuring safety of people and the environment. All methods for determining radionuclides will follow analytical best practises and will be carried out by an independent third party and certified analytical expert. Specific activity represents the activity per unit mass of a radionuclide and is usually given in units of becquerel per kilogram (Bq/kg) or curie per gram (Ci/g). Methods commonly used could include, not limited to:

1. Gamma Spectrometry: This technique measures the specific activities of natural radionuclides such in soil samples. By analyzing gamma radiation emitted from these isotopes, their presence and activity concentrations can be quantified.

2. Long-Lived Radioactive Dust (LLRD): During mining operations (drilling, blasting, material handling), airborne dust containing radionuclides can be produced. LLRD, which includes isotopes like ^{238}U, ^{234}U, ^{230}Th, ^{226}Ra, and ^{210}Po, could pose internal exposure hazards. Estimating dose conversion factors for dust will assist in assess the actual levels of risk.

3. Radiochemical Methods:

    a. Direct Analysis: Measures the rate of disintegration of a radioactive isotope.

    b. Neutron Activation: Involves irradiating a sample with neutrons to induce radioactivity, which can then be quantified.

    c. Isotope Dilution: Diluting a known radioactive isotope with a non-radioactive one to determine its concentration.

11 Project Schedule

Torngat Metals has developed a schedule outlining the duration and timing of key project phases including preparation, construction, operation, closure, and restoration, as well as environmental monitoring (post-operational, restoration phase) of the site. Following construction and start-up, the expected life of the mine is 30 years. No expansion is planned for the Torngat Metals Project. Regular operations during this period will include maintenance, if necessary, replacement of certain original facilities.

The start dates for the construction phase have not been determined as of yet. However, they will be planned to minimize the project's environmental impacts. The start of the construction phase will also coincide with the reception of all the necessary authorizations, permits and funding. A list of the main steps is provided below (Table 11-1).

Table 11-1: Strange Lake Project Milestones and Dates

Key milestone	Scheduled dates
Submission of the Preliminary Information on the Strange Lake Mine Project, north of the 55th parallel) to the Kativik Environmental Quality Commission (KEQC) and the Quebec Ministry of Environment, Fight against Climate Change, Fauna and Parks (MELCCFP)	May 2023
Strange Lake Rare Earth Mining Project Guidelines /Decision Kativik	*10 October 2023*
Submission of the harmonized Initial Project Description and Registration document to IAAC, NG and NL	30 September 2023
Summary of Issues- ENGLISH VERSION	*23 December 2023*
Summary of Issues- FRENCH VERSION	*23 January 2024*
Submission of the Project Notice for a rare earth separation plant to the Quebec Ministry of Environment, Fight against Climate Change, Fauna and Parks (MELCCFP)	10 November 2023
Guidelines MELCCFP #3211-14-043	*23 November 2023*
Start of the Pre-Feasibility Study (PFS)	October 2023
Pre-Feasibility Study (PFS) completed	February 2025
Start of Feasibility Study (FS)	March 2025
Feasibility Study (FS) completed	2025
Submission of the Environmental and Social Impact Assessment (ESIA) reports to each of the authorities involved	2025
Decision by each of the authorities involved	2026-2027
Development and construction phases:	**2026-2028**
Detailed engineering, applications for certificates of authorization, obtaining certificates and construction work (in phases)	2026-2028
Operational phase (30-year operation)	**2028-2058**
Beginning of mining operations and start of mining processing	2028
Closure and restoration phase	**2058-2063**
Active Closure: Restoration, re-vegetation and environmental monitoring; Water Treatment in used until water quality has reached guidance	2058-2063
Passive Closure: periodical monitoring	2063-2073 (minimum duration)

12 Potential Alternatives

12.1 Alternatives for Carrying Out the Project

Alternative designs have been considered for several components of the project and these have been and will be part of a comparative technical, environmental, social, and economic analysis process in order to select the best alternatives for the project.

At the Mine Site, these components include the following:

- Size of the pit and mining mode.
- Location of the Concentration Plant and Related Facilities (Industrial Area).
- Sorting and Concentration Processes (Mine Site).
- Management Method and Location of the Mine Residue Stockpile
- Location of final discharge points for treated water (mine water, sanitary wastewater).
- Water withdrawal sources (process water, drinking water).
- Location of the airstrip.
- Renewable Energy Production

Alternatives have also been considered regarding:

- Single Lane Access Road Corridor Alignment and Port Facilities Options
- Mode of transportation of the concentrate to the rare earth separation plant.
- Location of the rare earth separation plant
- Management Method and Location of the Process Residue Stockpile
- Process water withdrawal sources

The main alternatives considered so far are described further below in Sections 12.1.1 to 12.1.6.

Other alternatives would have to be studied and compared as part of the pre-feasibility and feasibility studies, and in the context of the impact assessment. The results of pilot tests on the process and the progressive development of more detailed engineering, as well as studies on the receiving environment (physical, biological, and social environments) will allow further optimization of the project for the needs of Torngat Metals, which could lead to the study of new variants. Within the framework of this optimization, the costs, the schedule, as well as the economic, technical, environmental, and social issues will be considered. Particularly at the environmental level, the GHG balance and the impact that climate change could have on the project are also considered in the comparative analysis of the variants.

For example, the following variants, and possibly other options, could therefore be considered for the optimization of the project:

- **Development phases:** During mine site preparation, a single lane access road (seasonal and private) between the mine and the eastern coast of Labrador, or other means of transportation during the winter period (i.e., winter airstrip), will be evaluated to transport materials and heavy equipment to site prior to the start of construction.
- **Construction phase:** For buildings and equipment, options based on the use of modules, containers or prefabricated sections will be considered given the constraints associated with climatic conditions and restrictions related to available modes of transport.

- **Operational mining phase (30-year operation):** Alternatives to the mining plan could be developed and analyzed as part of the feasibility study. Similarly, since both concentration and separation processes are currently being optimized, this work could lead to the development of new variants.
- **Closure and restoration:** The current closure concept is based on the premise that the site will need to be returned to the pre-project conditions, i.e., as a wildlife habitat allowing traditional activities (such as hunting, fishing and gathering) to resume. Depending on the results of the consultations with the communities and government authorities, options related to the ultimate use of the territory could be considered, for example, leaving in place the airstrip or a portion of the roads that could be used for regional development purposes.

12.1.1 Size of the Pit and Mining Mode

The characteristics of Strange Lake B-Zone deposit allow for only one mining mode, open pit. Underground mining tunnels is not an option at Strange Lake due to the rare earth elements located close to the surface.

Three options for the size of the mining pit were considered so far as part of the ongoing prefeasibility study conducted by Torngat Metals. These options have been described in Section 9.2.1. The option that has been selected is the Economic Pit RF 1.0: this pit design maintains a minimum distance of 30 m from the high-water level of Brisson Lake, but it also targets the resource more optimally and minimizes waste rock by limiting mining to the most concentrated areas (see Figure 9-1).

12.1.2 Location of the Concentration Plant and Related Facilities on the Mine Site (industrial area)

Various sites are being studied for the location of the concentration plant. These options were described at the beginning of Section 9.2 and illustrated schematically in Maps 9-3 to 9-7.

The site selection will be conducted as part of the technical studies (PFS, FS) and ESIA, and will be described in these reports. It will be based on economic, technical, environmental, social and health and safety criteria. In particular, the Indigenous communities concerned will be consulted to consider their knowledge of the territory and their concerns.

12.1.3 Sorting and Concentration Processes (mine site)

As detailed in Section 10.2, the sorting and concentration processes that will be used are currently being optimized and some process variants are still under review. In particular, there is an option to include an X-ray sorting (dry process) upstream of the fine grinding. This step would help separate the rocks containing sufficient resource from the waste rocks (gangue), essentially made up of quartz. For now, the geochemical characterization program (see Section 9.2.1 and Appendix D) considers the rejected fraction from X-Ray sorting would be characterized separately, if applicable.

The chosen option and its justification will be presented in the technical studies and the impact assessment.

12.1.4 Management Method and Location of the Mine Residue Stockpile (mine site)

The mine residue management methods that have been considered in the filing of Preliminary Information to MELCCFP and KEQC for the previous version of the project in 2015 included the deposition of residues in the form of a slurry in a pond (tailings pond) and the dry stacking of thickened residue. Five sites located south of the mine pit were delineated and examined in more detail at that time, considering the tailing pond option (Table 12-1). Torngat Metals has rejected the tailing pond option and kept only the dry stacking option. This choice places far fewer constraints on site selection and, above all, has much less impact on the terrain and water bodies.

At the present stage, only one Mine Residue Stockpile location is shown on the schematic mine layout options A, B and C (Maps 9-5, 9-6 and 9-7). This is, so far, the preferred site. It overlaps partially the old site option 1 described in Table 12-1. However, it has been positioned more conveniently in only one watershed, without touching a waterbody. This site is located within the Strange Lake alkaline complex, and drilling has been carried out to confirm the absence of exploitable mineral resources under the proposed mine residue stockpile area. However, this site selection will have to be validated with the results of the consultations with the communities concerned, the pre-feasibility and feasibility studies, as well as the impact assessment.

Table 12-1: Site evaluation matrix - Mine residue stockpile area (conducted in 2015)

MTAA Option nº	Mine residue management method	Results	Preliminary environmental justification	Other considerations (technical or legal)
1	Dry stacking of thickened residues	Preferred option	Site located in the same aquatic environment as site no. 4, but upstream from the latter	Within the Strange Lake alkaline complex containing REE mineralization, but drilling indicates that this area does not contain REE in economically exploitable concentration. Capacity probably sufficient for a 30-year period. The site can be significantly expanded, if necessary (to be confirmed by pre-feasibility and feasibility studies).
2	Dry stacking of thickened residues	Not retained for further consideration	Aquatic environment not well developed	Too far from B-Zone and too close to the Labrador-Québec border. Potential delays in the official determination of the interprovincial boundary for this site. Could be considered long-term for potential mine expansion. Partially outside the Strange Lake alkaline complex.
3	Dry stacking of thickened residues	Not retained for further consideration	Presence of ponds and streams with fish habitat	Unsuitable topography.
4	Deposition of residues in the form of slurry (pond)	Rejected	Presence of a small lake with presumed fish habitat, over an estimated area of 0.25 km^2	Better topography to install a dike that can contain slurry.
4A	Dry stacking of thickened residues	Second choice	Aquatic environment not well developed	Within the Strange Lake alkaline complex containing REE mineralization. Very close to the chosen option for the airstrip. Could be considered in the long term if option 1 proves insufficient or for the potential expansion of the mine.

12.1.5 Location of Final Discharge Points for Treated Water (mine water, sanitary wastewater)

The ultimate goal regarding the water lifecycle at the mine is having a water management strategy focusing on reuse of water and minimising or eliminating discharges in the receiving environment. Discharge, if any, would only occur on exceptional occasions in ice free months. In order to respond to exceptional situations that would require water to be discharged, three potential discharge options for the treated contact water and the treated process wastewater have been considered (see Section 24.3.2.6 for details):

- The first and preferred option, is to pump the water to the top of a hill and let it run down an intermittent creek with engineered wetland sections. The return of treated water to the Lake Brisson would then be made more progressively, and wetland features could be designed to further treat the water. This option will be evaluated in the ESIA.
- The second option is to discharge directly to the Lake Brisson in the most proximal bay. Although of less technical complexity, this option would not warrant enough dilution before the water reaches the lake. For this reason, this second option is not retained.

- The third option is to discharge in Lake Brisson, but rather using a diffuser. Given no significant flow detected in 2023 related to the presence of shallow bays and islands, that option includes long piping to get further away than the proximal bays surroundings the installations, and design of a diffuser to counterbalance the existing limiting conditions at site. This option will be evaluated in the ESIA.

A second discharge is anticipated for the sanitary circuit (domestic wastewater). Diffusers could also be used for the sanitary discharge, and they would be designed to ensure maximal dilution of any releases into the lake. To further minimize water use, greywater recycling systems are also being considered which would use water from sinks, showers and laundry as a water supply for non-potable purposes (toilet flushing, irrigation). Alternatively, Torngat Metals is in the process of evaluating the possibility of having the solid waste transported to an outside facility for treatment, and therefore only water would remain to be treated. Other option under consideration would be to integrate artificial wetlands in the domestic water treatment process and the use of greywater as a supply for dust suppression on-site.

12.1.6 Water Withdrawal Sources (process water, drinking water)

The concentration plant is expected to require an average of 3,888 m^3/day of water. In terms of process water supply, the primary objective is to avoid pumping water from Lake Brisson. A water management pond (WMP) will be built progressively during the construction phase to accumulate a water reserve and a minimum of 6-month water inventory of approximately 500,000 m^3.

Potential fresh water sources to build this inventory includes:

- from precipitations and snow melt;
- once excavation of the pit has commenced, water from the pit.

Once operational, the aim is to have a closed loop systems whereas much of the water as possible is treated and recycled within the system to prevent both intake and discharge. The sources of water to replenish losses in the process includes:

- water collection ponds receiving contact water from the various stockpiles and mining operation areas;
- water from the pit.

Environmental modelling of hydraulic resources for surface water, groundwater and interactions between them will be done to confirm potential sources and evaluate the impacts on the surrounding environment. These options, and others if required, will be assessed as part of the feasibility study and impact assessment.

12.1.7 Aerodrome with 1,500 m Runway (mine site)

Since 2011, a total of seven potential locations have been identified for the aerodrome, with a 1,500 m runway at the mine site. Options from 2011 were abandoned due to the establishment of prevailing winds while gathering the 2012 one-year onsite weather station (see Section 5 for the wind chart). In 2024, another option was abandoned, due to its proximity to and the significant terrain within Labrador (too close to the border).

As clearly described in Section 9.2.9, only two options were retained after a more in-depth examination of the topography, drainage conditions, aquatic features, limitations related to surface obstacles, prevailing winds, and other environmental constraints, the distance of the facilities from the mine site and the alignment of the road.

Both options are compared with each other in a preliminary manner, according to safety, technical and environmental criteria. They will be subject to validation during future consultations and studies, based on the following criteria:

- Prevailing winds – highest percentage of favourable prevailing winds.
- Environmental analysis – less potential impact on ecological systems and water resources.
- Grading analysis – no disturbance to topography in NL and a minimal limit of disturbance.
- Runway Safety Area and Airspace analysis – no impacts or penetrations to sensitive runway safety areas or surrounding airspace surfaces.

12.1.8 Renewable Energy Production (mine site)

Torngat Metals is considering using geothermal energy to minimize the reliance on fossil fuels. Moreover, as explained earlier in Section 9.6.1, Torngat Metals is also interested in purchasing energy from third-party renewable energy projects. To this end, Torngat Metals is open to proposals from third-party developers and, if appropriate, could become a partner in such a project insofar as studies demonstrate the environmental and social benefits.

The option that would be developed under Torngat Metals control, such as the geothermal energy, will be evaluated as part of the feasibility study and impact assessment of this project. Third-party propositions would be assessed independently by their Proponent.

12.1.9 Single Lane Access Road Corridor Alignment and Port Facilities Options

The road alignment seeks to reduce environmental effects by only operating seasonally and the design will be a single lane access road that would link the proposed mine site to the eastern coast of Labrador. Currently two options are considered (see Section 9.3; Maps 9-2 and 13-1). The first one (Option A) is to link the proposed mine site to existing port facilities, currently operated by Vale, in Anaktalak Bay. The second one (Option C) is to link the proposed mine site to new port facilities to be implemented in the southern portion of Voisey's Bay. At this time, two alignments (C1 and C2) are still presented and mapped for Option C, as the preliminary engineering design is still ongoing[10]. Regardless of the alignment chosen, Option C would take a more southern path than Option A, as a way to avoid the road alignment close to Ikadlivik brook, which is less than 100 m at several places for several kilometers for Option A, and therefore increasing its social acceptability with local communities. This variant does imply increased impacts on marine environments since a new port facility would need to be constructed in Voisey's Bay and also entails increased costs associated with the construction of the port facility. Option C1 will also require blasting in some areas but maintains greater distance from hunting and fishing brooks (closer to 1 km in most areas). However, C2 although not as close to important cultural brooks as Option A and for shorter distance, could be at distances of approximately 150 m in areas.

Prior to that scenario, other variants have been studied. One included an access road of 380 km entirely located in the province of Québec and heading towards Schefferville (Option B; Map 12-1). This variant was rejected as it would imply the construction of a major bridge (George River) and was likely to cause numerous impacts in wetlands located within the George River watershed, in addition to crossing Caribou herd protected areas. This corridor was also much longer, requiring the implementation of a relay camps along the route, and was deemed cost prohibitive.

[10] As stated in Section 9.3, Alignment C1 would stays on the plateau north of the Konrad brook. It will aim to minimize water crossings and to stay away from major streams and rivers. On the other hand. Alignment C2 would be a forestry type road and will aim to have a low constructability (easy build-up, with no large cut and fills).

Another variant studied was to link the proposed mine site to the Smallwood reservoir, where it would join the NL provincial road system (Option D; Map 12-1). This option was rejected as it was associated again with significant environmental impacts due to its length of 290 km; which would be implying numerous water crossings. The length of this option would also have required relay camps to be set up along the route for health and safety concerns, thus having an additional impact on land use and would also have resulted in significantly higher costs. In addition, and most importantly, this option, as well as Option B, would have given access to area of the Northern Territory, as the road was joining with existing roads in populated areas, therefore having a potentially much greater impact land use than Options A and C. Option A and Option C do not cross, nor is it close to any inhabited areas.

Access road Options A and C, including alignments C1 and C2 and considering the new port facilities linked to Option C, will be evaluated as part of the feasibility study and impact assessment and will be described in these reports. The choice of the recommended option will be based on economic, technical, environmental, social and health and safety criteria. In particular, the Indigenous communities concerned will be consulted to consider their knowledge of the territory and their concerns.

12.1.10 Mode of Transportation of the Concentrate to the Rare Earth Separation Plant

An alternate form of transport to/from the mine site has been considered by Torngat Metals, which is the hybrid airship technology. Torngat Metals is following closely the final stages of development of this technology and considers the possibility to ship the containers of concentrate by cargo airship when this technology becomes commercially available and authorized. However, as this technology is not yet available and its development is not under Torngat Metals control, it has been decided not to include this option in the project, as explained in Section 9.6.2.

Should the technology become available and if its promoter has obtained all the necessary authorizations, Torngat Metals will take the necessary steps to evaluate this transport option, make sure all compliance requirements would be met and, if deemed appropriate, negotiate with the supplier(s) involved. In terms of environmental and social impact assessment, this third-party proposition would have to be assessed independently by its Proponent.

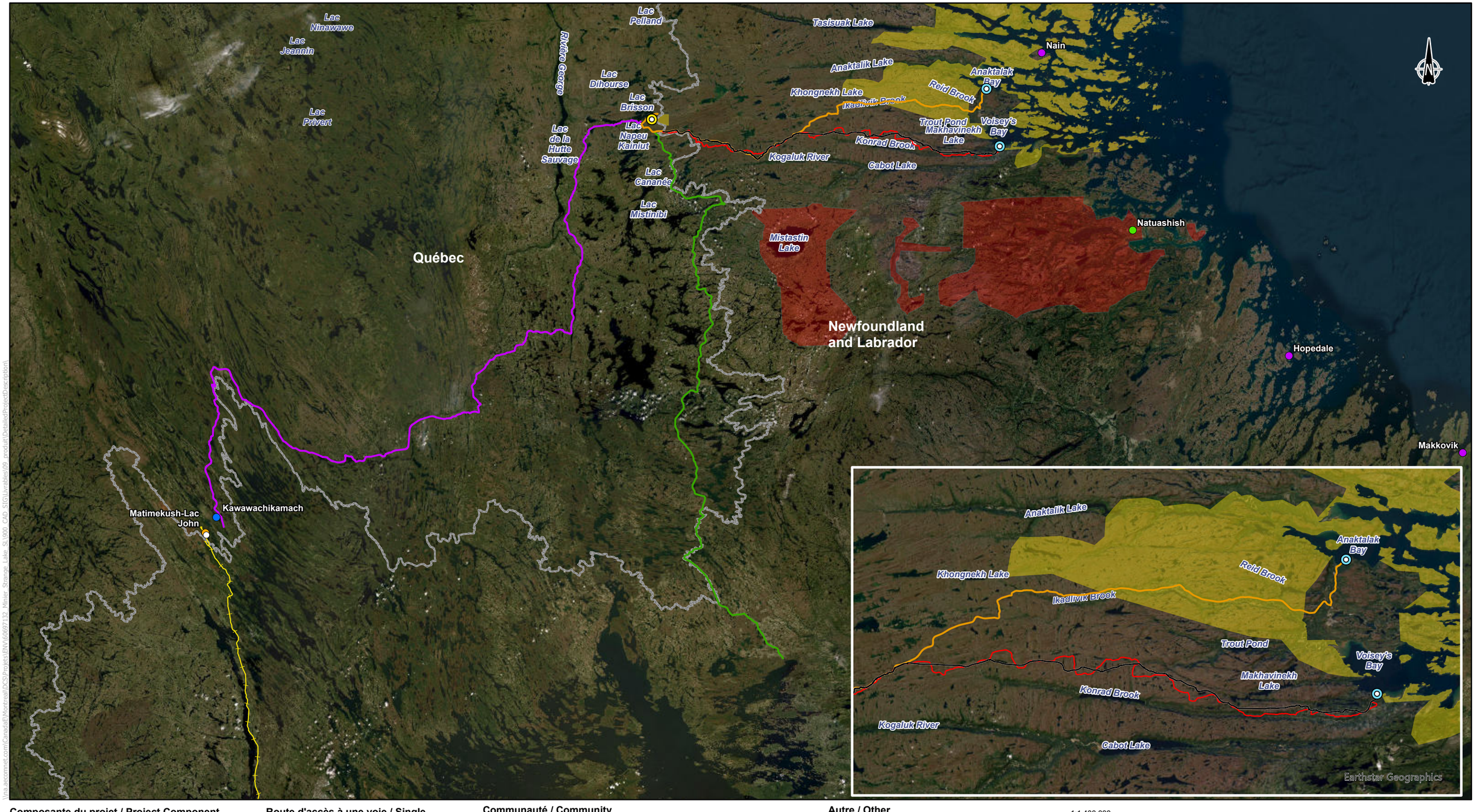
12.1.11 Location of the Rare Earth Separation Plant

The following alternative separation plant locations were considered:

- Bécancour: the “Parc industriel et portuaire de Bécancour” was the preferred location for the separation plant at the time of the PFS carried out by Quest in 2013. This option is no longer considered in the current project due to the unavailability of suitable land, resulting from the use of this park for the development of the battery industry.
- Baie-Comeau: the site proposed in the industrial area was not chosen mainly due to the insufficient space for Torngat Metals needs and the more extensive work required to bring in utilities, electricity and rail link.
- Saguenay: the site proposed in the Port of Saguenay industrial area was considered very attractive when Torngat Metals was considering using natural gas to fuel its furnaces. As Torngat Metals in an effort to reduce its GHG emission opted to use 100% electric power supply for the separation plant, this site is less suited to Torngat's needs, in addition to presenting more challenges in terms of integration into the environment.
- Sept-Îles – Pointe-Noire: this industrial area is reserved for large projects. Torngat Metals Project is considered too small to tie down valuable real estate that could be used by larger projects, as the separation plant would receive 150,000 to 200,000 t per year as opposed to over 24,000,000 for aluminum or iron ore projects. In areas where size is not an issue, the lands available can only be least and do not accept residues.

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composante du projet / Project Component

- Site potentiel des installations portuaires / Potential site for Port Facilities
- Mine et usine de concentration (Lac Brisson) / Mine and Concentration Plant (Lake Brisson)

Route d'accès à une voie / Single Lane Access Road

- Option A
- Option B
- Option C1
- Option C2
- Option D

Communauté / Community

Québec
- Innu
- Naskapi

Labrador
- Innu
- Inuit

- Terres des Inuit du Labrador / Labrador Inuit Lands (LIL)

Terres des Innus du Labrador / Labrador Innu Land

- Catégorie I / Category I

Autre / Other

- Frontière Québec et Labrador / Quebec and Labrador border
- Chemin de fer / Railway

1:1 400 000

0 10 20 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic data: RNCan (2022)
Terres des Inuit du Labrador / Labrador Inuit Lands (LIL): Government of Newfoundland and Labrador (2011)

Carte 12-1
Options étudiées pour la route d'accès à une voie

Map 12-1
Single Lane Road Access Studied Options

AECOM

\\ca.aecomnet.com\Canada\Montreal\DCS\Projects\ENV\60697132_Mines_Strange_Lake_SL\900_CAD_SIG\Livrables\09_produit\Detailed\ProjectDescription\

The “Parc industriel ouest – Jonction Arnaud” (also known as Parc industriel Vigneault) of the Sept-Îles industrial port facility is therefore advantageous over all the above sites for the following reasons:

- suitability of available space to needs;
- short-term availability of utilities;
- existing rail connection;
- easier access to electrical power.

The Jonction Arnaud site was also the site suggested by the local business community and the town of Sept Iles as being their preferred location for our project. Moreover, the site can support the deposition of residues.

12.1.12 Management Method and Location of the Separation Plant Process Residue Stockpile

Dry stacking of process residue, as described in Section 9.5.3, is the only long-term storage option considered by Torngat Metals, since the storage in a tailing pond would involve greater risks and utilise much larger area. However, Torngat Metals is committed to examining possible storage alternatives that would allow for future exploitation of the stored residues. Torngat Metals will explore and evaluate the feasibility of future recovery methods that can be foreseen at the design stage, as part of the handling optimization options. These methods must meet applicable regulatory requirements and not compromise storage safety. The options considered will be developed, described, and evaluated as part of the feasibility study and impact assessment.

In terms of location of the residue stockpile, the following were considered:

- Pointe-Noire: Torngat Metals can only rent space in Pointe Noire and landlords did not accept residues.
- Municipal landfill area: the potentially available space is reserved for future landfill expansion.

The preferred location for the residue stockpile area at Sept-Iles is beside the separation plant, on the eastern part of the lots 3 708 322 and 3 708 323, as well on an undivided plot of land, as shown on Figure 13-1. The fact that the site is adjacent to the plant offers a number of advantages, particularly in terms of integrated water management (see Section 24.3.3) and residue transport (movement on the same property, by covered conveyor).

12.1.13 Separation Plant - Process Water Withdrawal Sources

As explained in more details in Section 9.5.2.1, there are three possible sources of process water at Sept-Îles for the built-up of the initial water reserve before starting the operation of the separation plant, and for occasional additions of make-up water during operational phase:

- in Rivière au Foin: since this is a small watershed, draw would have to be very progressive;
- by drawing from the stormwater runoff and snowmelt water;
- trucked in from off-site: the preferred off-site location would be the at the treated water outlet of the wastewater treatment plant.

These options will be evaluated as part of the feasibility study and impact assessment.

12.2 Project Alternatives

There is no alternative or economically viable alternative to developing a mine site in order to extract the Strange Lake rare earth deposit. The Strange Lake Project is the only feasible alternative to extract the rare earth minerals resources of this deposit.

PART D – LOCATION INFORMATION AND CONTEXT

13 Project Location

Appendix G outlines 58 sheets of the project components, at a scale of 1:12 500, from the mine site.

13.1 Geographical Coordinates

Mine site:

The Torngat Metals Strange Lake property is covered by maps from the National Topographic system map sheets (NTS: 24A08, 24A09, and 14D05). The project is located at the following geographical coordinates (decimal degrees, NAD83):

- B-Zone Deposit centroid: Latitude: 56.323 N; Longitude: - 64.166 W

Single lane access road (seasonal and private):

At the Québec-Labrador border, the road corridor corresponds to 18+000 kilometric point, at coordinates 56.270274 N; -64.089263 W. The total alignment of the road corridor is approximately 160 km long, and ends on the eastern coast of Labrador (2 options), for which Option A is closer to Nain. It crosses maps SNRC 24A08, 14D01, 14D02, 14D03, 14D04, 14D05, 14D06, 14D07, 14D08 and 14C04

- Start of the access road in Québec: Latitude: 56.332 N; Longitude: - 64.125 W
- End of the access road in Eastern Labrador
  - Option A: In Edwards cove, Anaktalak Bay: Latitude: 56.353 N; Longitude: - 62.095 W
  - Option C : In Voisey''s Bay : Latitude: 56.219 N; Longitude: - 61.974 W

Optimisation of the road corridor is still underway and is expected to be completed by Q3 2024. Currently, under Option A, there are a total of 286 water crossings: 13 out of the 286 being in Québec (4,5%), and 273 being in Labrador (95,5%). From these, the current alignment under Option A would require the construction of three main water crossings at the following geographical coordinates:

1. Main Water Crossing #1 (#WC 116): 29 m span bridge at 56° 10' 50.70" North 63° 28' 55.32" West
2. Main Water Crossing #2 (#WC 177): 16 m span arch culvert at 56° 20' 19.99" North 62° 59' 25.46" West
3. Main Water Crossing #3 (#WC 555): 16 m span arch culvert at 56° 21 ’16.63’’ North 62° 06’ 14.93" West

For Option C, the alignment is the same in Québec up to the first bridge (#116), but a southern direction is then taken towards Voisey’s Bay. A total of 126 water crossings can be detected on a scale of 1:50,00 through a desktop assessment. Besides bridge #1 (#116), the other main water crossings can be found:

1. Main Water Crossing #2 (#WC 566): 16 m span arch culvert at 56° 16' 13.00" North 63° 02' 15.74" West
2. Main Water Crossing #3 (#WC 596): 16 m span arch culvert at 56° 12' 11.14" North 61° 59' 32.99" West

Container storage and handling facilities on the eastern coast of Labrador:

- Option A Access Road : leading to existing port facility of Vale's Port (Edwards Cove)

The new container storage and handling facilities would be built in Edwards Cove (Anaktalak Bay), near the existing Vale's Port, in Labrador. The exact location is still to be determined in collaboration with Vale.

- Option C Access Road: leading to Voisey's Bay

New port facilities would be built in Voisey's Bay, south of the mining area operated by Vale, in Labrador. The exact location is still to be determined.

Rare Earth Separation Plant :

The new separation plant will be built in the "Parc industriel ouest – Jonction Arnaud" (also known as "Parc Vigneault") of the Sept-Îles industrial port facility, on the north shore of the St-Lawrence River in the province of Quebec, at the following geographical coordinates (decimal degrees, NAD83):

- Separation plant site centroid: Latitude: 50.292 N; Longitude: - 66.385 W

13.2 Site Maps

Strange Lake Rare Earth Mining Project main components are shown on maps provided at Section 9 (Maps 9-1 to 9-8). The communities nearest to the project area are presented on Maps 3-2 and 3-3. In Section 14, the watersheds, the natural environment, the land regions and districts as well as the caribou protected areas are presented (Maps 14-1 to 14-5). The proposed maritime route is shown on Map 14-6. Below, Maps 13-1 to 13-4 present the preliminary study areas, the mining claims and the Strange Lake Alkaline Complex (SLAC).

13.2.1 Study Areas

In order to carry out the different surveys and evaluate the project's impact on the different Valued Ecosystem Components, three preliminary study areas have been elaborated for the northern components as well as the Sept-Îles components.

Three maps are avalaible to understand the study areas for the project. These are :

- Preliminary Project and Local Study Area in the North (Map 13-1)
- Preliminary Project and Local Study Area for the project components in Sept-Îles (Map 13-2)
- Preliminary Regional Study Area (Map 13-3)

The proposed project study area consists of a 200 m buffer zone around different components. For the northern components (mine site, road corridor, and container storage and handling facilities), the 200-meter buffer zone was established from the mining lease or the preferred road corridor. A larger buffer could be considered in certain area of the road, should the land use study or another component suggest it would be pertinent. As for the Sept-Îles components, the 200 m buffer was added to the lot limits (Maps 13-1 and 13-2), but this study area could be extended to include additional receptors. The project study area will be used to carry out most of the biophysical component's surveys.

The local study area for the northern components , which will be used for the land use study, corresponds to a 20 km buffer on either side of the road corridor, as well as a 50 km radius around the mining lease (Map 13-1). This 50 km radius covers the flow of water between Lake Brisson and George River. It also covers the Lac de la Hutte Sauvage, including the Wedge Point site (located on the western shore of the lake), which is an area of great historical and cultural importance to the Quebec Innu. It is important to note that an Innu from Matimekosh operated an adventure tourism business in 2012-2013 at this location. This local study area will also be used for the caribou component as they travel long distances and it will cover historical caving sites. For the Sept-Îles components, a 1 km buffer zone was established from the lot limits (Map 13-2). This study area will be used for the land use study, but this study area could be extended to include additional receptors.

The regional study area takes into consideration all the communities that will be impacted by the project (Map 13-3). The socio-economic conditions, local capacity and workforce analysis will be carried out within the limits of the regional study area. The human health, quality of life and psychosocial impacts will also be analyzed using this regional study area. The regional study area is the same for the northern components and the Sept-Îles components.

These study areas are preliminary and will be reevaluated once the final footprint of the components is established and the impact assessment is initiated.

13.3 Official Land Description

13.3.1 Mine, Concentration Plant, Aerodome and Part of the Access Road Located in Quebec

All the mineral claims covering the B-Zone of the Strange Lake Project are owned in totality by Torngat Metals. The project is covered by 209 individual mineral claims in Québec and 63 “cells” in the Newfoundland and Labrador claims licence system. Those claims are covering a total area of approximately 9 994.65 ha (MICON, 2019). Map 13-4 illustrates the Torngat Metals mining claims in Quebec. The mineral claims in Québec cover the B-Zone and a portion of the Main Zone REE deposits. The current Torngat Metals claims cover the known extent of the Lac Brisson Pluton also known as Strange Lake Alkaline Complex (SLAC). Map 13-5 illustrates the Strange Lake Alkaline Complex (SLAC) as well as the property geology in relation the site topography.

Mine facilities, concentration plant, aerodrome and Quebec’s portion of the access road would be built on the land covered by these mineral claims.

13.3.2 Part of the Access Road Located in Newfoundland and Labrador, Container Handling and Storage Area and Port Facilities

Option A: This alignment passes through three types of land classification. From the provincial border for 138.5 km the access road is located within the limits of the Labrabor Inuit Settelment Area (LISA). Labrador Inuit Lands (LIL) are also crossed by the access road for 35.9 km. Finally, the access road enters the Voisey’s Bay Area between km 156 and 157 for a distance of 14.4 km. This section of the road, as well as the container handling storage area, would be located within the Vale Inco surface lease.

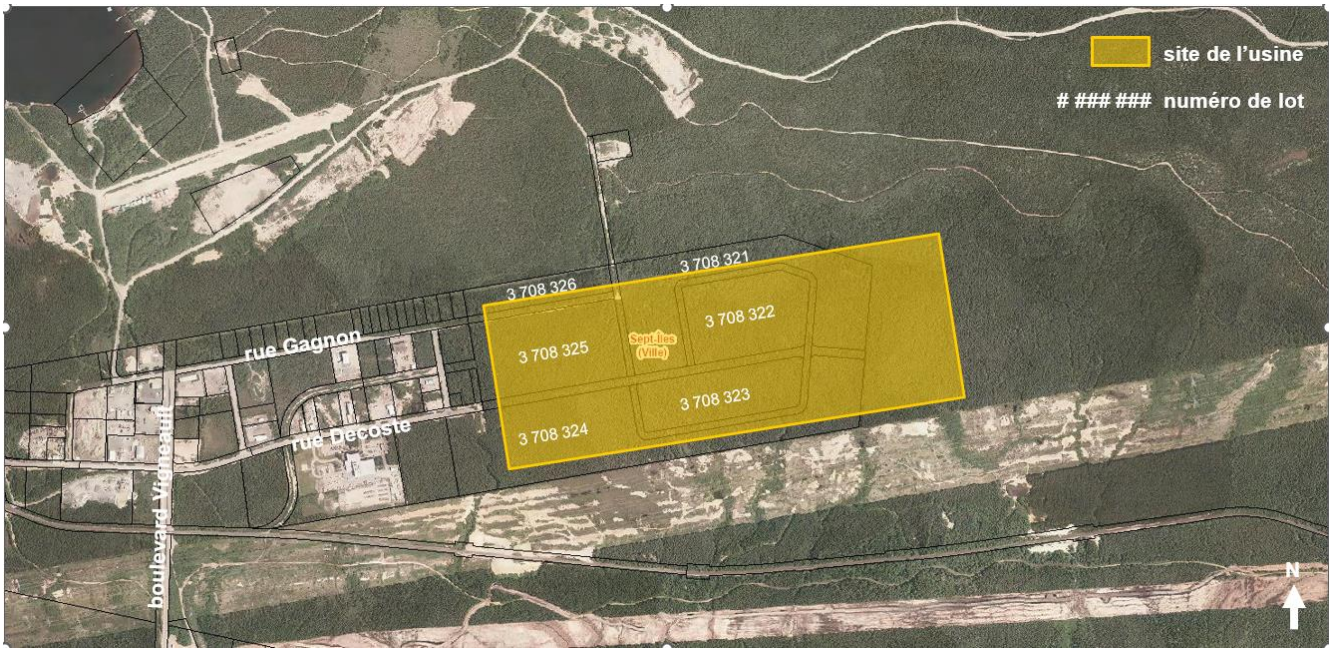
Option C (C1 and C2): Both alignments for Option C and the container handling and storage area and port facilities are located within the limits of the LISA for its entire length. The alignments are also partially located within the limits of the Labrador Innu Settlement Area of the Labrador Innu Land Claims Agreement-in-Principle (New Dawn Agreement). The length of the access road alignment Ci located within the Labrador Innu Settlement Area is about 39.2 km and for alignment C2 is about 43.62 km. The container handling and storage area and port facilities is also located in the Labrador Innu Settlement Area.

13.3.3 Separation Plant

The proposed rare earth separation plant will be located in the “Parc industriel ouest – Jonction Arnaud” (also known as “Parc Vigneault”) in the industrial port facility of Sept-Îles (QC). As shown on Map 9-8, the closest inhabited area (a portion of Sept-Îles) is located less than 3 km south of the proposed separation plant site. In addition, the Sept-Îles detention facility is less than 2 km southwest of the planned plant site. The plant facilities and the process residue stockpile area would be build on the following lots, as well on an undivided plot of land, as shown on the Figure 13-1:

- 3 708 322
- 3 708 323
- 3 708 324
- 3 708 325

These 4 lots are currently owned by the city of Sept-Îles. Discussion will be held with the city of Sept-Îles for a potential acquisition agreement conditional on project authorization.



Source : ministère des Ressources naturelles et des Forêts, 2023b | Adapted by AECOM

Figure 13-1 : Land on which the separation plant and residue stockpile area would be built

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Zone d'étude / Study Area

- Zone d'étude préliminaire du projet / Preliminary project study area [1]
- Zone d'étude locale préliminaire / Preliminary local study area [2]

[1] *Zone tampon de 200 m autour de la limite de propriété et de la route d'accès / 200 m buffer zone around the property limit and the access road)*

[2] *Zone tampon de 50 km autour de la limite de propriété et de 20 km autour de la route d'accès / 50 km buffer zone around the property limit and 20 km around the access road*

Composante projet / Project Component

- Limite de propriété / Property limit
- Site potentiel des installations portuaires / Potential site for Port Facilities

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Autre / Other

- Vale Inco Surface Lease / Bail de surface de Vale Inco
- Frontière Québec et Labrador / Quebec and Labrador border
- Terres des Inuit du Labrador / Labrador Inuit Lands (LIL)

1:530 000

0 5 10 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic data: RNCan (2022)
Terres des Inuit du Labrador / Labrador Inuit Lands (LIL): Government of Newfoundland and Labrador (2011)

Carte 13-1
Zone d'étude préliminaire du projet et locale au Nord

Map 13-1
Northern Components Preliminary Project and Local Study Area

AECOM

ca.aecomnet.com\Canada\Montreal\DCS\Projects\ENV\60697132_Mine_Strange_Lake_EL1000_CAD_GIS\Livrables\09_prod\fr\DetailedProjectDescription\

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Zone d'étude / Study area

- Zone d'étude préliminaire du projet / Preliminary project study area [1]
- Zone d'étude locale préliminaire / Preliminary local study area [2]

[1] *Zone tampon de 200 m autour du site potentiel de l'usine / 200 m buffer around the potential site of the plant*

[2] *Zone tampon de 1 km autour du site potentiel de l'usine / 1 km buffer around the potential site of the plant*

Composantes du projet / Project Components

- Site potentiel de l'usine de séparation des terres rares (Sept-îles) / Potential Site of the Rare Earth Separation Plant (Sept-Iles)

Autre / Other

- Zone industralio-portuaire de Sept-Îles / Sept-îles industrial port area
- Route principale / Primary road
- Limite municipale / Municipal boundaries

1:62 000

0 1 2 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic Data: NRCan (2022)
Limite municipale / Municipal boundaries: MRNF (2023)
Zone industralio-portuaire de Sept-Îles / Sept-îles industrial port area: Gouvernement du Québec (2018)

Carte 13-2
Zone d'étude préliminaire du projet et locale pour les composantes du projet à Sept-Îles

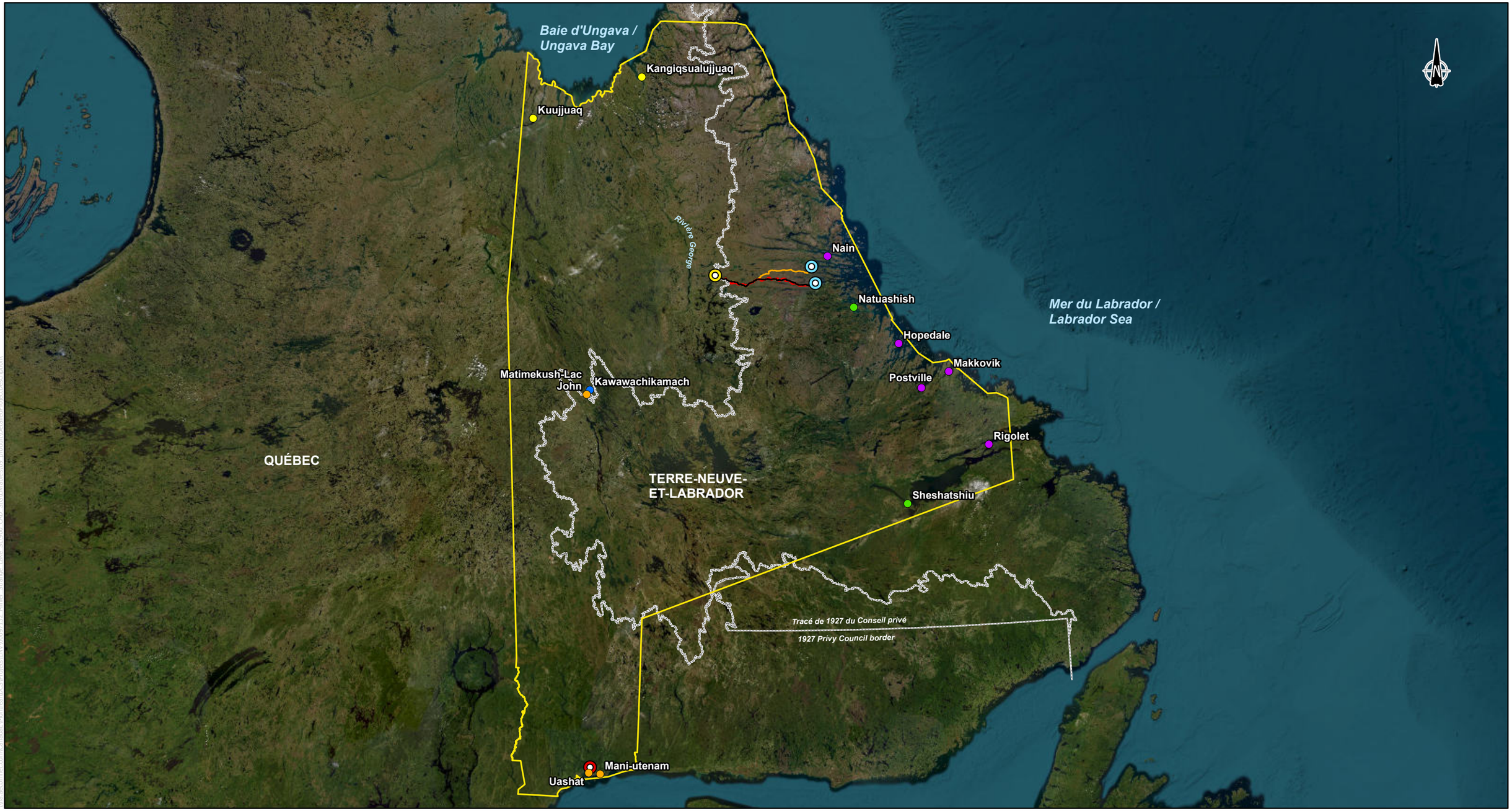
Map 13-2
Sept-îles Components Preliminary Project and Local Study Area

AECOM

\\Aecomnet.com\Canada\Montreal\Projets\EMV\60697132_Mines_Strange_Lake_CLO_SG\Livrables\09_produit\Data\ProjectDescription\

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Zone d'étude / Study Area

- Zone d'étude régionale préliminaire / Preliminary Regional Study Area

Composantes du projet / Project Components

- Site potentiel des installations portuaires / Potential site for Port Facilities
- Mine et usine de concentration (Lac Brisson) / Mine and Concentration Plant (Lac Brisson)
- Site potentiel de l'usine de séparation des terres rares (Sept-îles) / Potential Site of the Rare Earth Separation Plant (Sept-Iles)

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Communauté / Community

Québec
- Innu
- Inuit
- Naskapi

Labrador
- Innu
- Inuit

1:5 000 000

0 50 100 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic Data: NRCan (2022)

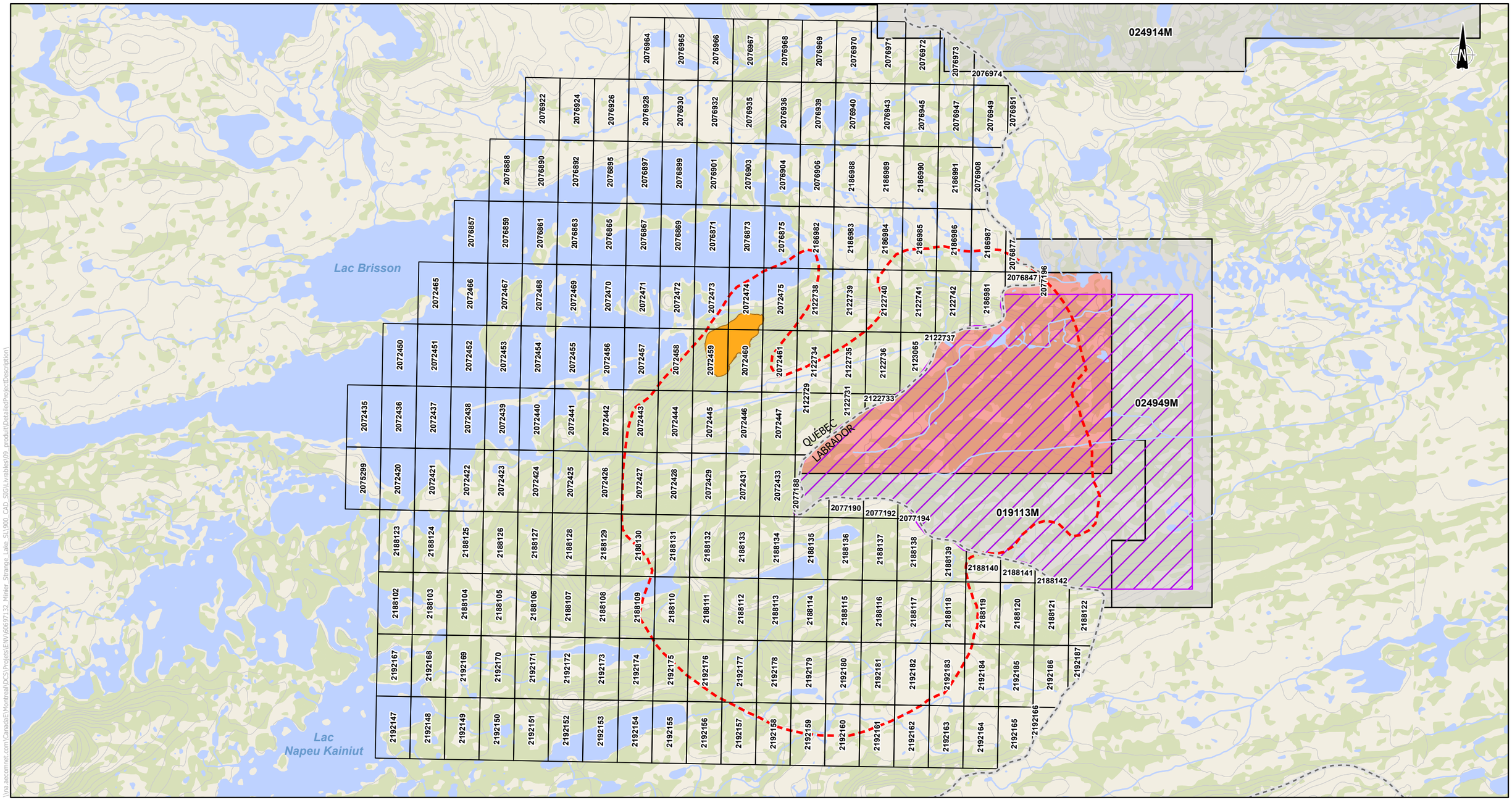
Carte 13-3
Zone d'étude régionale préliminaire

Map 13-3
Preliminary Regional Study Area

AECOM

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Complexe alcalin du lac Strange / Strange Lake Alkalic Complex

Gisement minier de la Zone B / B-Zone Mineral Deposit

Titre minier actif de Métaux Torngat (Québec) / Torngat Metals Active Mining Claim (Quebec)

Titre minier actif de Métaux Torngat (Labrador) / Torngat Metals Active Mining Claim (Labrador)

Autre / Other

Frontière Québec et Labrador / Quebec and Labrador border

Terres des Inuit du Labrador / Labrador Inuit Lands (LIL)

Zone d'exclusion / Exempt mineral lands (Labrador Inuit Association (LIA))

1:55 000

0 500 1 000 1 500 m

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic Data: NRCan (2022)
Titres miniers (Québec) / Mining Claims (Quebec): MRNF (2023)
Titres miniers (Labrador) / Mining Claims (Labrador): Government of Newfoundland and Labrador (2023)

Carte 13-4
Titres miniers de Métaux Torngat

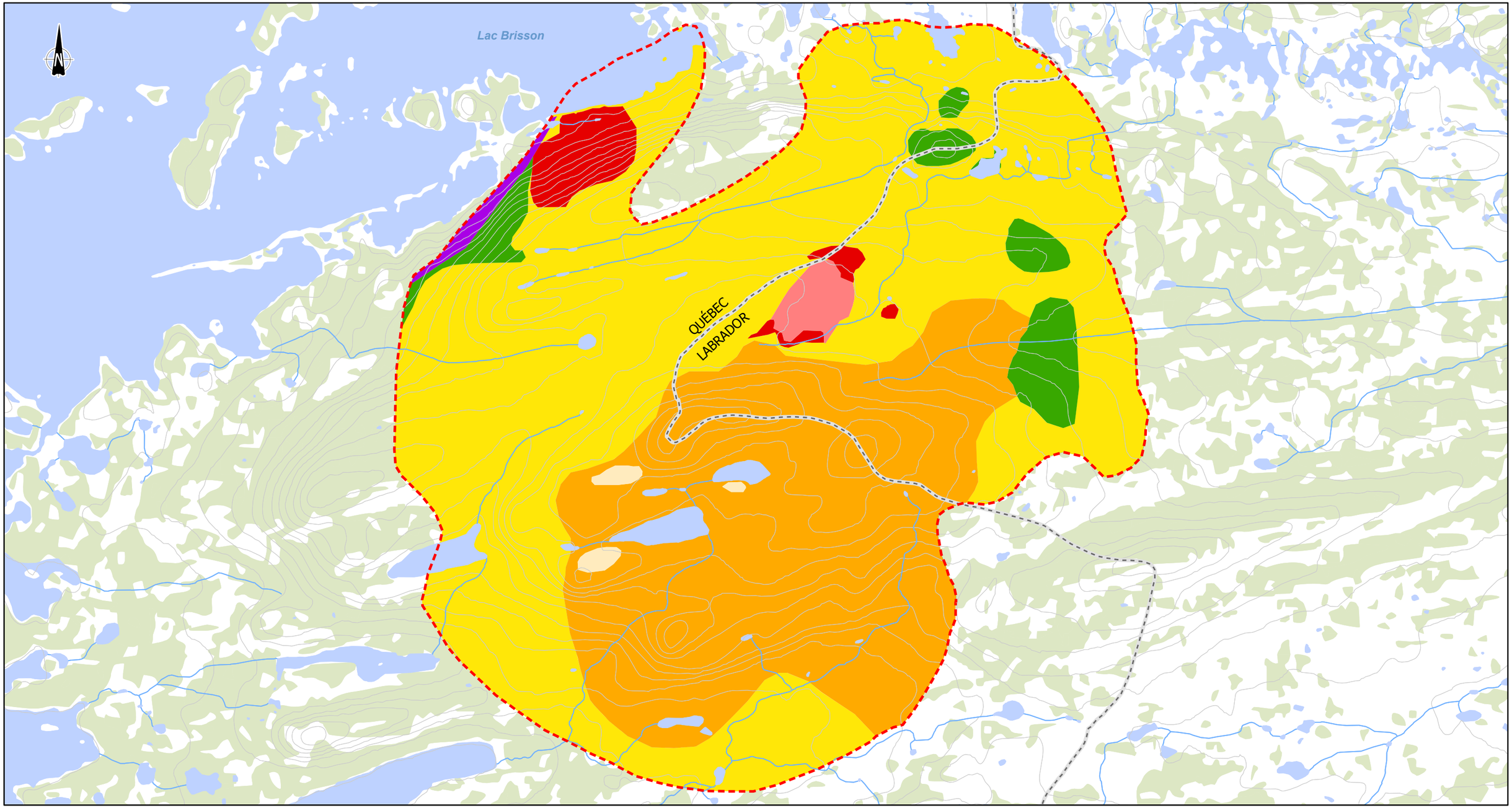
Map 13-4
Torngat Metals Claims

AECOM

\\ca.aecomnet.com\Canada\E\Montreal\DCS\Projets\ENV\60697132_Mines_Strange_Lake_SL\900_CAD_SIG\Layouts\09_produit\Detailed\ProjectDescription\

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Complexe alcalin du lac Strange / Strange Lake Alkalic Complex

Granite avec inclusions enrichies / Enriched inclusion-bearing granite

Brèche à fluorite et hématite / Fluorite-hematite breccia

Granite peralcalain hypersolvus / Hypersolvus granite

Granite peralcalin subsolvus / Inclusion bearing subsolvus granite

Granite peralcalin subsolvus / Quartz monzonite

Pegmatite et aplite riche en terres rares / REE-bearing pegmatite-aplite

Gneiss indifférentié / Unsubdivided gneiss

1:35 000

0 1 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic Data: NRCan (2022)
Géologie du roc / Bedrock Geology: Technical Report on the Preliminary Economic Assessment, MICON (2019)

Carte 13-5
Complexe alcalin du lac Strange et géologie du roc

Map 13-5
Strange Lake Alkaline Complex and Bedrock Geology

AECOM

\\na.aecomnet.com\Canada\E\Montreal\DCS\Projets\ENV\60597132_Minier_Strange_Lake_SLI\900_CAD_SIG\Livrables\09_produit\Detailed\ProjectDescription\

13.4 Proximity to Nearest Local Communities

There is no permanent inhabited buildings within the project footprint related to the proposed mine site, road corridor and handling and storage facilities in Edwar's Cove (Anaktalak Bay) / Voisey's Bay port facilities. The closest non-Indigenous community to these 3 projects component are Schefferville, which is located 235 km southwest of the mine site and Northwest River, located around 345 km south of the proposed handling and storage facilities in Edwards Cove/ 320 km south of the proposed port facilities at Voisey's Bay. However, Nain is located 156 km east of the proposed mine site and 26 km northeast of the Edwards Cove handling and storage facilities / 39 km from the Voisey's Bay port facility, making it the closest community to these components.

The situation is different concerning the proposed separation plant since it is planned to be located in the industrial port zone of the city of Sept-Îles. In this case, the closest inhabited area (a portion of the city of Sept-îles) is located less than 3 km south of the proposed separation plant site. In addition, the Sept-Îles detention facility is less than 2 km southwest of the proposed separation plant site.

13.5 Proximity to Indigenous Communities

The proposed mine site is located in Nunavik, a territory administered by the Kativik Regional Government, located in Kuujjuaq, which is located 325 km northwest of the proposed mine site. The closest communities from the proposed mine site are mainly Indigenous communities:

- Nain (Newfoundland and Labrador), 156 km to the east;
- Natuashish (Newfoundland and Labrador), 194 km to the southeast;
- Hopedale (Newfoundland and Labrador), 263 km to the southeast;
- Postville (Newfoundland and Labrador), 317 km to the southeast;
- Makkovik (Newfoundland and Labrador), 341 km to the southeast;
- Kawawachikamach (Quebec), 230 km to the southwest;
- Matimekush-Lac John (Quebec), 237 km southwest;
- Kangiqsualujjuaq (Quebec), 343 km northwest;
- Sheshatshiu (Newfoundland and Labrador), 404 km to the southeast;
- Kuujjuaq (Quebec), 325 km to the northwest;
- Rigolet (Newfoundland and Labrador), 434 km to the southeast.

The closest communities from the handling and storage facilities in Edwards Cove / Voisey's Bay port facilities are also Indigenous communities.

- Nain (Newfoundland and Labrador), 26 km to the northeast / 39 km northeast;
- Natuashish (Newfoundland and Labrador), 81 km to the southeast / 62 km southeast;
- Hopedale (Newfoundland and Labrador), 151 km to the southeast / 138 km southeast;
- Postville (Newfoundland and Labrador), 217 km to the southeast / 200 km southeast;
- Makkovik (Newfoundland and Labrador), 225 km to the southeast / 215 km southeast;
- Rigolet (Newfoundland and Labrador), 340 km to the southeast / 320 km southeast;
- Kawawachikamach (Quebec), 341 km to the southwest / 337 km southwest;

- Kangiqsualujjuaq (Quebec), 343 km to the northwest / 364 km northwest;
- Sheshatshiu (Newfoundland and Labrador), 345 km to the south / 322 km south;
- Matimekush-Lac John (Quebec), 347 km southwest / 341 km southwest;
- Kuujjuaq (Quebec), 424 km to the northwest / 441 km northwest.

The closest Indigenous communities from the proposed separation plant in Sept-Îles are Uashat located 7 km to the south and Mani-utenam located 15 km to the southeast.

The lands involved by the present project are subject to different land agreements and/or land claims by Indigenous groups (Map 3-1).

Nunavik Inuit (Quebec)

In 1975, Nunavik Inuit signed the James Bay and Northern Quebec Agreement (JBNQA), which led to the creation of 15 northern villages including Kujjuaq and Kangiqsualujjuaq. The signing of JBNQA also provided Nunavik Inuit with territorial rights on the lands concerned by the agreement. These lands are defined in the following groups:

- Category I lands are reserved exclusively for use by Inuit;
- Category II lands are considered public domain in Quebec but hunting, fishing and trapping rights are reserved for Inuit, while forestry, mining and tourism development authority is shared;
- Category III lands reserve some specific hunting and harvesting rights for Inuit, but all other uses are permitted under Quebec legislation concerning public lands.

According to the JBNQA, the proposed mine site and the Quebec portion of the corridor identified for the proposed seasonal road are located on Category III lands.

Naskapi Nation of Kawawachikamach

In 1975, the new Schefferville Naskapi Band decided to become involved in the negotiations leading to the signature of the James Bay and Northern Québec Agreement (JBNQA). The arrangement did not work and the JBNQA was signed without the band. In 1977, the Schefferville Naskapi began their own negotiations leading to the signature of the Northeastern Québec Agreement (NEQA) in January of 1978. Following this agreement, the community built a new village which was registered as the Naskapi village of Kawawachikamach in 1981. The Naskapi Nation of Kawawachikamach received some territorial rights on lands concerned by the agreement. These lands are defined as the following:

- Category I lands are reserved exclusively for the use of Naskapi;
- Category II lands are considered public domain in Quebec, but hunting, fishing and trapping rights are reserved for Naskapi, and forestry, mining and tourism development authority is shared;
- Category III lands reserve some specific hunting and harvesting rights for Naskapi, but all other uses are permitted under Quebec legislation concerning public lands.

According to the NEQA, the proposed mine site and the Quebec portion of the corridor identified for the proposed seasonal road are located on Category III lands. The Ungava Band, which became the Naskapi Nation of Kawawachikamach, is essentially using the territories concerned by the NEQA. It is, however, possible that some hunters travel to Inland Labrador for caribou hunting.

Quebec Innu

Unlike the Naskapi Nation of Kawawachikamach and the Nunavik Inuit, the Innu of Matimekush-Lac-John and Uashat mak Mani-Utenam have not signed any territorial agreement, and they are still engaged in an ongoing land claim process with the federal and provincial governments. The lands covered by this claim (the Nitassinan) include the proposed mine site, as well as the western portion of the corridor identified for the proposed seasonal road (essentially the Québec portion, but also a small part of the Labrador portion).

Nunatsiavut Inuit (Labrador)

The Labrador Inuit Lands Claims Agreement (LILCA), signed in 2005 between Canada, Newfoundland and Labrador and the Nunatsiavut Inuit Government, recognized the Nunatsiavut Inuit's territorial rights in Northern Labrador. The agreement created two categories of land:

- The Labrador Inuit Settlement Area (LISA) consists of land and ocean (referred to as the Zone) extending to the limit of Canada's territorial sea. The Settlement Area includes Labrador Inuit Lands and the five Inuit communities of Nain, Hopedale, Makkovik, Postville and Rigolets. In the northern part of the Settlement Area, a large part of land is set aside for the establishment of the Torngat Mountains National Park (upgraded from a park reserve in 2008, after settling outstanding Labrador land claims of Quebec-based Inuit);
- Labrador Inuit Lands (LIL) cover a much smaller territory than LISA where Inuit have the exclusive rights to a 25 per cent ownership interest in subsurface resources, ownership of quarry materials, and to carving stone. LILis found mainly along the coast with one notable exception, the "main zone" of the Strange Lake peralkaline granite complex; a property about 2 km east-southeast of Torngat Metal B-Zone on the Labrador side which had been claimed/explored in the past by IOC (early 1980's).

The proposed mine site (entirely located in Québec) borders a Labrador Inuit Land. The corridor identified for the proposed seasonal access road is crossing a Labrador Inuit Settlement Area entirely for Option C, as well as a Labrador Inuit Land for Option A, and will join either Anaktalak Bay (VBA) for Option A or Voisey's Bay for Option C. VBA was created following the signature of IBAs between INCO (now Vale), Innu Nation of Labrador and Nunatsiavut Inuit Government concerning the exploitation of a nickel-copper-cobalt mine in the vicinities of the Bay. Innu and Inuit harvesting rights are recognized in the VBA.

Labrador Innu

In 2008, Innu Nation of Labrador signed the New Dawn Agreement with the Government of Newfoundland-and-Labrador. This land claim agreement in principle was endorsed by referendum by the Innu population in 2011. Three categories of land were identified and mapped:

- Labrador Innu Lands (Category I or CI) where the Innu have legal title, jurisdiction to make laws in relation to specific matters, and rights to resource royalty sharing and Impact and Benefit Agreements (IBAs) for land development.
- Labrador Innu Settlement Area (Category II or CII) remains Crown Land but the Innu have special rights and benefits concerning resource royalty sharing as well as consultation on environmental assessments, economic development and IBAs for major projects. The northern limit of the Category II Lands touches the south shore of Voisey's Bay, therefore part of the access road Option C is located within these lands.
- Category III Lands (CIII) are areas where the Innu are able to conduct their traditional hunting for migratory species of wildlife without the need for provincial government permits.
- Portions of the corridor identified for Option A of the proposed seasonal road are located a few kilometers north of the New Dawn Agreement lands. This corridor joins the Voisey's Bay area (VBA), where the Labrador Innu must be consulted and give their agreement to any development project. A portion of the corridor identified for Option C of the proposed seasonal road crosses Labrador Innu Settlement Area lands covered by the New Dawn Agreement. For this option, the Innu have specific rights on the land and must also be consulted.

13.6 Proximity to Federal Lands

To our knowledge, there is no federal land within the project study area.

Labrador Inuit Land (LIL)

The project may involves two Labrador Inuit Lands (LIL). First, the proposed mine site (in Quebec) borders on Labrador Inuit Land 4B-27. In addition, the corridor identified for the proposed seasonal road Option A crosses Labrador Inuit Land 4B-28, which lies west of Voisey's Bay and Anaktalak Bay. Only the first section, 4B-27 would apply to Option C.

14 Biophysical Environment Description

The description of the biophysical environment takes into account the data acquired during the 2011-2014 baseline studies, i.e. as part of the last pre-feasibility study, and from new data acquired in 2023. This data will be updated under a full-baseline study (2023-2025) and the methodological approaches are described in following sections. The updated data will comply with the current regulatory and legislative frameworks.

For the baseline study, biophysical workplans, governmental departments of Quebec (Ministère de l'Environnement, de la Lutte aux changements climatiques, de la Faune et des Parcs, MELCCFP), Federal, NG and NL have been and will be contacted in order to assemble proper information on best timing for fieldwork assessments and inventories, such as for migratory birds, caribou, Arctic charr, and Indigenous land and resources uses. The DFO Québec Region and Labrador were contacted regarding the FAFH and meetings were held in 2023 and in 2024 to discuss our workplan for the project. The same approach was taken at the provincial level in 2023, with MELCCFP (FAFH, contamination).

Thus, each of the environmental components is treated in accordance with current guidelines, guidance documents and standards. These are presented under each of the subsections and relate in particular to the following authorities:

Federal

- Impact Assessment Agency of Canada (IAAC) /Agence d'évaluation d'impact du Canada (AEIC)
- Environment and Climate Change Canada / Environnement et Changement Climatique Canada (ECCC)
- Health Canada / Santé Canada
- Transport Canada/Transport Canada
- Natural Resources Canada / Ressources Naturelles Canada
- Department of Fisheries and Oceans / Pêches et Océans Canada

Provincial -*Québec*

- Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP)
- Commission de la qualité de l'environnement Kativik (CQEK)
- Ministère des Ressources naturelles et des Forêts (MRNF)

Provincial -*Government of Newfoundland and Labrador*

- Department of Environment and Climate Change, Environmental Assessment Division

Nunatsiavut Government

- Department of Lands and Natural Resources
- Nunatsiavut Research Centre

At the time of submitting this document, engagement activities and data acquisition have started for wildlife (birds, water quality and water crossing fish habitat characterization along the access road in Quebec), and more surveys will be conducted in 2024-2025 for other components. A gap analysis was conducted prior to 2023 planning and data acquisition in order to comprehensively address each component and identify gaps from the baseline studies that were elaborated between 2011 and 2014. Data acquisition will continue throughout 2024 and 2025 in order to elaborate new baseline studies and align with the Feasibility Study report to be produced. The acquired data will also be incorporated into the detailed project description, and in the ESIA for the project.

The following maps are part of Section 14:

- Watersheds Within the Project Area in the North (Map 14-1)
- Natural Environment of the Bay of Sept-Îles (Map 14-2)
- Land Regions and Districts – Physiography (Map 14-3)
- 2023 Sampling Stations and Surveys at the Mine Site (Map 14-4)
- Caribou Protected Areas (Map 14-5)
- Proposed Maritime Shipping Route (Map 14-6)

14.1 Physical environment

14.1.1 Weather and Climate

14.1.1.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The northern components of the Stange Lake Project are located in the Taiga ecozone of the Canadian Shield (ecozone 05), more specifically in the Kingurutik and Fraser Rivers ecoregion (05.3.077). Northern Quebec and Labrador are characterized by a cold subarctic climate zone with long, cold winters with heavy snowfall and short, cool summers.

Table 14-1 provides climate data for the two nearest weather stations, Nain (156 km east) in Labrador and Schefferville airport (235 km southwest) in Quebec. Data at these stations are collected by Environment Canada and are made available on their web site. Table 14-1 provides the normal climate data at the two stations. Snow and ice cover freshwater bodies for six to eight months per year. Due to low evapotranspiration rates, the terrain becomes waterlogged in several areas during the summer months.

Table 14-1: Station data for calculating climatic normals in Canada from 1991 to 2020 for Nain and from 1971 to 2000 for Schefferville

	Nain - Newfoundland	Schefferville- Quebec*
Average Temperature - January (°C)	-17.1	-24.1
Average Temperature - July (°C)	10.2	12.4
Extreme maximum (°C) – long-term	33.3	34.3
Extreme minimum (°C) – long-term	-41.5	-50.6
Minimum average annual temperature (°C)	-6.3	-0.5
Maximum average annual temperature (°C)	1.9	-10.0
Precipitation (mm)	870.9	822.9
Snowfall (cm)	421.0	440.5
Rainfall (mm)	468.8	408.1
Average snow cover (cm)	24	31

Source: https:// climat.meteo.gc.ca/climate_normals

* The climatic normals for the 1991 to 2020 period for the Schefferville station are not yet available.

Given the distance of the existing weather stations from the mine site, Torngat Metals and Approach Navigation Systems Inc. (ANS) have installed a weather station at the mine site in the fall 2023 (Figure 14-1). This station continuously measures the following parameters: wind speed and direction, atmospheric pressure, air temperature, dew-point temperature, relative humidity, precipitation accumulation (pluviometry), snow depth, and solar radiation.

The station is equipped with a data logger and transmits the hourly observations via Iridium satellite. Every month, a quality assurance and quality control (QA/QC) protocol based on the World Meteorological Organization's (WMO) recommendations is carried out. To this end, the locally obtained observations are reviewed for their completeness and physical and statistical properties. Furthermore, the data is compared against global reanalysis data (i.e., ERA5).



Figure 14-1 : Weather station installed at the mine site in the fall 2023

A previous automatic weather station at the mine site was installed in the beginning of September 2011 on a hill on a peninsula in Brisson Lake close to the camp site. It recorded instantaneous values of temperature, barometric pressure, humidity, solar radiation, wind speed, wind direction, snow depth and rainfall (Figure 14-2). This station gathered data for over one year at least until November 2012, which is the minimum requirement from the *Ministère de l'Evironnement, de la lutte contre les changements climatiques, de la Faune et des Parcs* (MELCCFP) for developing an atmospheric dispersion model.[11]

[11] Leduc. R. 2005. Guide de la modélisation de la dispersion atmosphérique, Québec, MDDEP. Direction du suivi de l'état de l'environnement, envirodoq no ENV/2005/0072, rapport no QA/49, 38p



Figure 14-2 : Weather station installed at the mine site in September 2011

Temperature: Comparison of temperatures between the mine site and the governmental weather stations

From October 2011 to May 2012, temperatures were colder at the mine station compared to the Nain station (Table 14-2). In summer 2012, temperatures were warmer at the Mine station and in September 2012, they started to be colder again.

Table 14-2: Monthly difference of temperature from October 2011 to November 2012 between the mine site and the Nain station

Temperature (°C)	2011			2012										
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov
Daily Average	-2.8	-3.8	-4.1	-5.2	-4.7	-4.7	-4.0	-2.4	3.6	2.3	2.4	-1.3	-2.5	-3.9
Daily Maximum	-3	-3.9	-4.0	-5.5	-5.3	-4.5	-3.0	-1.8	5.5	2.3	2.0	-1.8	-2.8	-4.1
Daily Minimum	-2.4	-3.6	-4.3	-5.4	-4.0	-5	-5.1	-3.1	1.7	2.3	2.8	-0.8	-2.3	-3.7
Extreme Maximum	-1.1	-3.7	-3.9	-6.5	-3.1	-4	-0.6	-6.0	0.0	0.8	0.2	0.5	-0.7	-7.3
Extreme Minimum	-2.4	-5.3	-6.0	-5.2	-5.5	-4.4	-7.6	-7.0	0.8	1.9	1.3	-0.4	-3.5	-7.4

In general, temperatures were colder at the mine station compared to the Schefferville station (Table 14-3).

Table 14-3: Monthly difference of temperature from October 2011 to November 2012 between the mine site and the Schefferville station

Temperature (°C)	2011			2012										
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov
Daily Average	-1.6	-1.2	0.6	0.6	-1.5	-3.8	-2	-3.5	-1.9	-0.3	0.6	0.0	-0.4	0.1
Daily Maximum	-2.5	-1.8	0.0	-0.6	-3.7	-5.6	-2.3	-4.6	-1.6	-0.5	0.5	-0.3	-1.0	0.2
Daily Minimum	-0.6	-0.5	1.1	1.9	0.7	-2.0	-1.7	-2.4	-2.2	0.0	0.6	0.3	0.1	0.1
Extreme Maximum	-3.4	-1.7	-0.9	3.1	-4.7	-5.5	-1.4	-15	-0.2	2.5	0.2	-0.1	1.2	1.3
Extreme Minimum	-0.8	5.1	4.0	4.2	6.3	5.1	-2.2	-6.3	-1.2	-1.0	2.8	1.1	-0.4	-2.4

The following table (Table 14-4) presents the averages of monthly differences between the mine site and governmental weather stations from Oct 2011 to Nov 2012. Based on this 14-month period, it seems that the mine site is characterized with temperatures generally 1°C colder than those encountered at Schefferville and more than 2°C colder than at Nain.

Table 14-4: Averages of monthly differences between the mine site and governmental weather stations (Oct 2011 to Nov 2012)

Temperature (°C)	Mine Site vs Nain	Mine Site vs Schefferville
Daily Average	-2.2	-1.0
Daily Maximum	-2.1	-2.1
Daily Minimum	-2.4	-0.3
Extreme Maximum	-2.5	-1.8
Extreme Minimum	-3.6	1.0

Precipitation: Comparison of precipitations between the mine site and the governmental weather stations

During the 14-month period, Schefferville received a total of 859 mm of precipitation compared to 839 mm at Nain. On a seasonal basis, Schefferville had less precipitation than Nain in winter but more precipitation in May, June, August and September of 2012 (Table 14-5).

Table 14-5: Monthly difference of precipitation from October 2011 to November 2012 between the Schefferville station and the Nain station

	2011			2012										
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov
Precipitation	11	14	-23	-21	-26	-47	-39	23	61	-41	92	56	-65	25

The comparison of rainfall between the mine station and Nain or Schefferville is not straightforward because Environment Canada website doesn't present rainfall data but rather total precipitation data (snowfall + rainfall). If we assume that precipitation only fell as rain during the 2012 summer, it rained less at the mine site than at Schefferville (besides July). No clear trend was observed with the Nain station because the mine site received more rain in June and August but less in July and September than the Nain station. However, the total amount of rain was nearly the same between the mine and the Nain station over the summer.

Wind: Comparison of wind statistics between the mine site and the governmental weather stations

At the meteorological station, a weathervane was installed at a height of 2-3 m (Figure 14-2). The instrument recorded the highest average wind speed in December 2011 while the lowest was observed in summer (June to August. The seasonal direction of prevailing winds was variable during the measurement campaign. Indeed, in October 2011, May and June, prevailing wind directions were easterly while in January, February, and October 2012 the most frequent winds came from the west and in September and November 2012 prevailing wind directions were southerly. At the hourly scale, nearly 50% of the wind readings gathered between October 2011 and November 2012 were oriented between WNW and SSW at the Mine station. Precautions must be taken when using this data since there are no recordings of maintenance or calibration on the instruments or quality control (QA/QC) on the data.

During the 14-month period, the mine station had stronger winds (besides November 2012) than the Nain and Schefferville stations (Table 14-6). Wind speeds at the mine site were closer to those measured to Nain in fall, winter and spring, whereas they were nearer to those observed at the Schefferville station last summer.

Table 14-6: Monthly difference of mean hourly wind speed (km/h) from October 2011 to November 2012 between the Mine station and the Environment Canada stations

	2011			2012										
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov
Mine vs Nain	0.8	0.6	4.5	2.0	2.7	3.5	3.6	8.2	7.8	7.9	6.3	7.4	2.3	-2.0
Mine vs Schefferville	6.7	8.3	13.3	8.3	6.5	7.1	3.8	6.5	4.8	5.6	4.9	9.9	6.8	5.4

At the monthly scale, prevailing wind directions were the same at the mine site and Nain station in March, May and June 2012 while the mine had the same prevailing wind direction than Schefferville only in April 2012.

It should be noted that the wind roses of the Schefferville and Nain stations had similar shapes for the previous 5 years period (2007-2011) (Figure 14-3).

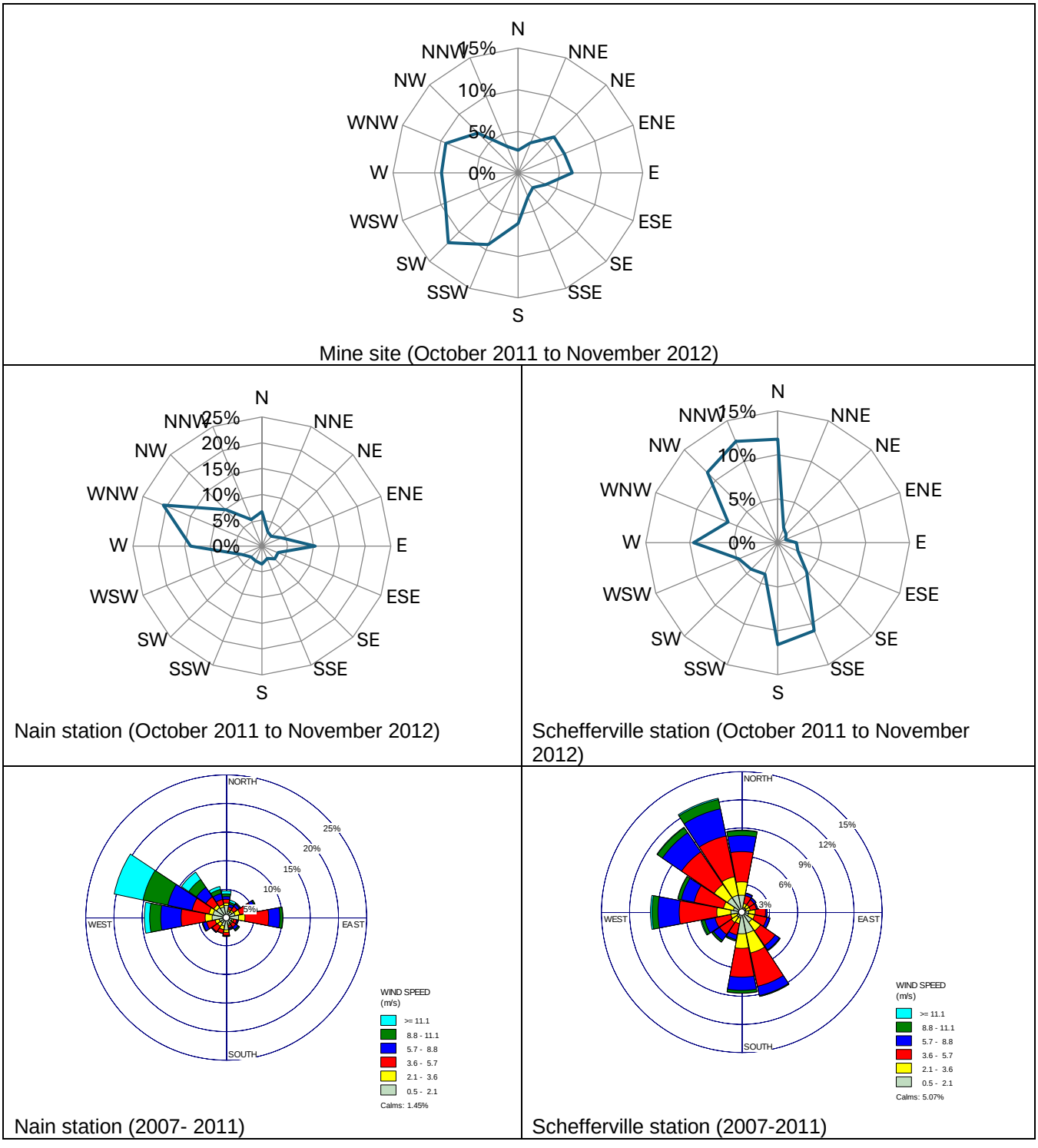


Figure 14-3: Wind rose at the hourly scale at the mine site, Nain station and Schefferville station.

14.1.1.2 Separation Plant (Sept-Îles project component)

The separation plant in Sept-Îles is located in the Boreal Shield ecozone of the Canadian Shield (ecozone 06), more specifically in the Central Laurentian ecoregion (06.3.101). Northern Quebec is characterized by a cold subarctic climate zone with long, cold winters with heavy snowfall and short, cool summers. Table 14-7 provides climate data (1991-2020) at the Sept-Îles airport weather station. Snow covers the lands for seven months per year.

Table 14-7 : Climatic normal at Sept-Îles from 1991 to 2020

Parameters	
Average Temperature - January (°C)	-14.5
Average Temperature - July (°C)	15.1
Extreme maximum (°C) – long-term	36.6
Extreme minimum (°C) – long-term	-43.3
Minimum average annual temperature (°C)	-3.7
Maximum average annual temperature (°C)	6.1
Precipitation (mm)	1077.4
Snowfall (cm)	-
Rainfall (mm)	-
Average snow cover (cm)	-

Source: https://climat.meteo.gc.ca/climate_normals/
Note: For the 1991–2020-time horizon, rain- and snowfall records and average snow cover are not available for the Sept-Îles, Quebec station.

14.1.2 Ambient Air Quality

14.1.2.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The closest air quality monitoring station to the northern components of the project (mine, road, container storage and handling facilities) is located in Goose Bay and measures only "ground-level ozone" (Government of Canada, 2023). Baseline data was collected *in situ* at the Strange Lake mine site in the fall of 2011 (AECOM, 2011). Ambient air quality at the mine site was assessed and compared to the NAAQOs, which are the equivalent of today's Canadian Ambient Air Quality Standards, or CAAQS. The CAAQS are established as air quality objectives (nitrogen dioxide (NO_2), sulphur dioxide (SO_2), fine particulate matter ($PM_{2.5}$) and ozone (O_3)) under the Canadian Environmental Protection Act of 1999. They also are the key element of the Air Quality Management System (AQMS) implemented by the federal government across the country (CCME, 2023). No air ambient sampling was undertaken in Labrador for the road corridor. It is important to note that all material shipped using the road will be containerised, there will be no bulk shipping, thus reducing the potential for air pollution from the concentrate dust. Ambient air quality parameters were selected based on the various pollutants likely to be emitted by the project since few pollutants from anthropogenic sources are emitted at the site location. The following pollutants were monitored: $PM_{2.5}$, PM_{10}, Total Suspended Particles (TSP), metals including a selection of eight rare earth elements ("particles"), SO_2, NO_2, volatile organic compounds (VOC), asbestos and radon. No anomalies were noted, and the air quality test results were typical of remote and undeveloped areas.

No concerns were raised with regards to the Vale's port vicinity at Edwards Cove, based upon 1995-1997 Environmental Studies for TSP, dustfall, SO_2, and NO_2 - prior to the Voisey's Bay Mine Project. In addition, the *2021 Ambient Air Monitoring Report (Government of Newfoundland and Labrador, 2021)* refers to three air monitoring stations in Voisey's Bay. Earch station was installed at different strategic location to monitor mining, processing and port activities over the year 2021. The first station, the *Accommodation Unit station,* monitored the ambient levels of $PM_{2.5}$ and NO_x / NO_2 on a continuous basis. For NO_x / NO_2, the ambient air criteria were not exceeded on any occasion in 2021, however, for $PM_{2.5}$, the 24-hour criteria was exceeded on two occasions in July owing to a localized forest fire. The section station, installed at the *Crusher Site,* monitored the ambient levels of NO_x / NO_2 only on a continuous basis. The ambient air criteria were not exceeded on any occasion in 2021. The third station,

installed at the *The Port Site*s monitored the ambient levels of Total Particulate Matter (TPM) on a continuous basis. The 24-hour ambient air criterion was exceeded on twenty-seven occasions in 2021, due in large part to the construction of new silos in the general vicinity. The construction resulted in the monitoring station being moved approximately 110 metres to the north-northwest in April. Of the twenty-seven exceedances, three occurred in May, five occurred in June, seven in July, eight in August, two in September and two in November.

Studies to be carried out:

For the northern components of the project, an ambient air quality measurement campaign is planned at the mine site and port facilities in 2025. This study will be integrated in the EIS as one document aiming to present air quality baseline. The baseline study will establish initial contaminant concentrations over a representative period (i.e. for more than one season over a year). In addition to the air contaminants traditionally related to metalliferous projects (i.e. PM, TSP, Metals - as particulates SO_2, NO_2, VOCs), additional parameters specific to rare earth minerals, concentrates or residues will be included in the baseline ambient air quality study, such as: cerium (CAS 7440-45-1), yttrium (CAS 7440-65-5). Given the likely presence of radionuclides, the following elements will also be considered: uranium-238 decay chain: U-238, Th230, Rn-222 and Pb-210, and for the thorium-232 decay chain: total Th of the series (Th232 and Th-228).

As NAAQS thresholds have been modified since 2011, previous results will be compared with new standards effective in 2020 and those forecast for 2025, when applicable. A detailed analysis of the air quality report findings, highlighting any differences associated with current conditions will be provided in the EIS.

It should be noted that there are no anthropogenic activities along the portion of the road that will be used in Quebec and in Newfoundland and Labrador. It is anticipated that the initial ambient air quality conditions observed at the mine site will also be used for the new access road. The initial concentrations of contaminants present in the sampling campaign at the mining and port facilities site will be used for the air emissions modeling activities for the project northern components (mine site, road corridor, container storage and handling facilities).

Mine site:

The current standards that apply are dictated by the Clean Air Regulation[12] (c. Q-2, r. 4.1) established under the Quebec Environment Quality Act. This Clean Air Regulation stipulates in Section 197 that construction of a stationary source of contamination is prohibited if it will likely result in an increase of the concentration of a contaminant above the air quality standards of contaminants listed in Schedule K (MELCCFP, 2023). In 2017, the MDDELCC (today MELCCFP) published the technical guidelines *Préparation et réalisation d'une modélisation de la dispersion des émissions atmosphériques (MELCCFP, 2017 – now under revision)*. These guidelines were developed to require that any mining promoter demonstrate compliance to the applicable air quality standards via a modeling study of the dispersion of atmospheric contaminants. In addition, *Directive 019 on the mining industry* (MDDEP, 2012) is the tool commonly used for the analysis of mining projects requiring the issuance of a certificate of authorization under the EQA, for projects subject to the environmental impact assessment and review procedure and for projects carried out on the territory of the Baie-James and Northern Quebec.

Hence, for air emissions modeling activities, the following will be provided:

- All stationary and fugitive emission sources of particulate matter, vapors and gases generated by mining activities, to demonstrate compliance with the standards of the Clean Air Regulation. For each of these sources, it must specify:
  - The nature of the contaminants
  - The quantity emitted (metric ton/year)
  - The flow (m^3/h),

[12] Better known in French: Règlement sur l'Assainissement de l'Atmosphère

  - The gas temperature (°C) and
  - The concentration of the contaminant (mg/Nm^3)
- Indication on treatment systems or measures taken to prevent, eliminate or reduce the release of contaminants and the percentage of efficiency.
- Identification of the methods and places of storage, deposit or elimination of this dust (in case dry dust collectors are used).

Climate and meteorological data source will be updated as a new meteorological station was installed at the mining site in fall 2023. Recommendations regarding the air modeling options, inputs (meteorological data, topographic data, land cover, etc.) was provided using the *Guide de la modélisation de la dispersion atmosphérique (MDDEP, 2005)*. The air modeling workplan will be agreed with both federal and provincial (QC) governments before conducting any air emissions modeling activities.

Road corridor to port facilities:

The Air Pollution Control Regulations, established under the Environmental Protection Act of Newfoundland and Labrador (2004), defines the ambient air quality standards (prescribed in Schedule A of the Regulations (Government of Newfoundland and Labrador, 2004)) for the province. Because of this regulation, air monitoring could be required to establish baseline conditions for the road corridor and be compared to the provincial standards.

As previously mentioned, climate and meteorological data (temperature, precipitation, wind speed & direction) is being currently monitored and collected at the mine site since fall 2023. In addition, verifications will be made to confirm if other existing monitoring stations (i.e.: Vale Port, Schefferville) could be used and be representative within the planned road corridor.

As a portion of the road is also in the province of Quebec, discussions will be held with the federal, provincial (NL, Qc) and Nunatsiavut governments to confirm baseline air monitoring strategy as well as the air emissions modeling technical specifications. A workplan will then be prepared in accordance with all requirements.

14.1.2.2 Separation Plant (Sept-Îles project component)

An air quality study (MDDEP, 2010) was published by the MELCCFP in 2010 in which they reviewed Sept-Îles historical Air Quality data and conducted air sampling over a year. The study concluded that the air quality was influenced by the mining and metallurgy industries. On an annual basis, the Sept-Îles air quality was comparable to typical urban or suburban environments. However, the report note that over short periods (12 hours or less) total particulate concentrations may be elevated in the sectors located to the south and sometimes to the east of the city. Also, from June 2014 to May 2015, MELCCFP have conducted air quality sampling by installing their own monitoring station in the Parc-Ferland sector in Sept-Îles, a site close to the envisioned Torngat Metals Separation plant. $PM_{2.5}$, TPM, metals, VOCs, HAP, furan dioxin were sampled. This report (MDDELCC,2016) mentioned that no air quality threshold were exceeded during that period. Finally, the Northern Institute for Research in Environment and occupational Health and Safety (INREST) published another air quality study (INREST, 2016) in 2016 for the Sept-Îles territory. Eight (8) sampling stations measured the following parameters between January 2012 and December 2013: TPM, $PM_{2.5}$, metals (Aluminium, Beryllium, Iron, Manganese), SO_2, HAP. Over the 24-month study period, criteria were exceeded on eleven (11) occasions, one event being for TPM and ten (10) for $PM_{2.5.}$ It was noted that the study scope was limited since all INREST private members were involved on a voluntary basis and did not monitor each above-mentioned parameter. A detailed analysis of the previously mentioned studies will be integrated into the Separation Plant's Air Quality Baseline Study and included as an appendix to the impact study.

Studies to be carried out:

The Air Quality Standards applicable to the Sept-Îles Separation plant are dictated by the Clean Air Regulation (c. Q-2, r. 4.1) established under the Quebec Environment Quality Act. A preliminary desktop analysis will be conducted to identify representative air quality monitoring stations (NAPS, RSQAQ) for the Separation plant site. Following this exercise, a baseline air quality monitoring workplan will be developed and shared with regulatory authorities. In addition to the air contaminants traditionally related to metalliferous projects (i.e. PM, TSP, Metals - as particulates SO_2, NO_2, VOCs), additional parameters specific to rare earth ores, concentrates or residues will be included in the baseline ambient air quality, such as: cerium (CAS 7440-45-1), yttrium (CAS 7440-65-5). As per requested in the Project's Directive from the MELCCFP, the following elements will also be included: uranium-238 decay chain: U-238, Th230, Rn-222 and Pb-210, and for the thorium-232 decay chain: total Th of the series (Th232 and Th-228).

Following the air modeling workplan's approval by regulatory authorities, the Separation Plant's air monitoring campaign, and eventually, air dispersion modeling activities, will be undertaken when the plant design will be sufficiently developed. Air monitoring results will be compared to new NAAQS standards effective in 2020 and those forecast for 2025, when applicable. A detailed analysis of the air quality report findings, highlighting any differences associated with current conditions will be provided in the EIS.

14.1.3 Ambient Noise Level

14.1.3.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

A background noise study was conducted by AECOM and published in December 2012, in the document *Strange Lake B-Zone – Physical Environment Baseline Surveys – Background Noise Study, 2011* (AECOM, 2012a). This study included approximately 24 hours of noise measurement data at one location identified to be representative of the general extents of the potential study area for the project. The maximum hourly ambient sound levels (LAeq 1h) at the monitoring site were 37.7 dBA during the day and 31.5 dBA at night.

The consideration of noise and vibration effects on the surrounding environment is addressed by Quebec's *Directive 019*, which has been updated in 2012 (MDDEP 2012), after the background noise study was conducted. However, as the noise monitoring was conducted with respect to the Document 98-01 (MELCCFP publication *Traitement des plaintes sur le bruit et exigences aux entreprises qui le génèrent* 2006), which is referenced in *Directive 019* for the assessment of stationary noise sources, the technical execution of this study still appears to be valid as this 2006 noise criteria document has not been updated since the time of reporting. The maximum hourly ambient sound levels (LAeq 1h) values mentioned above are still below the most stringent noise criteria (45 dBA-day, 40 dBA-night) set out in the *Directive 019*.

It is important to mention that no baseline noise monitoring was undertaken in Labrador representative of locations near the planned access road between sites. Background noise in the road's valley segment may be different compared to the plateau due to the presence of tree/wind interaction in the valley, and presence of a large water body in the plateau area.

Studies to be carried out:

The number of noise monitoring locations will be increased in the baseline noise assessment update to accurately capture more up-to-date background sound levels for the expected larger study areas, specifically at any potential noise sensitive locations of concern based on stakeholder consultation. Land use activities and their locations (e.g., hunting, gathering, spiritual, camp sites, etc.) will be further clarified as a part of the engagement process with the local Indigenous group(s) traditional knowledge holders in order to determine the locations of noise sensitive locations such as camp sites near project activities.

The field work to be conducted will also include baseline noise monitoring along the road segment between the site and the port storage facilities, at sensitive receptors located within appropriate distance. Monitoring will be carried out in accordance with current expected best industry practices, including:

- Installing portable wind meters to more accurately capture localized weather effects.
- Increasing measurement time from 24 hours to a minimum of 48 hours, as is typical in longer term monitoring assessments.
- Audio filtering of noise events that aren't typical of background noise levels near the project (e.g. helicopters, wildlife right next to the unit, thunder);
- Include the expanded footprint of the access road connecting to the container storage and handling facilities nearby Vale's port, or new Voisey's Bay Port, within the potential study area;
- Inclusion of the full data-set during reporting.

To provide context for the changes in noise and vibration levels resulting from the project's construction and operation, it is necessary to compare them to baseline levels. However, any proposals for reducing project-related noise and vibration will be modeled based on federal (Health Canada guidelines, 2017), provincial (Quebec – MELCCFP – *Directive 019*, MTMD – *Politique sur le bruit routier*, Newfoundland and Labrador), limits, thresholds, and industry guidelines (United States Bureau of Mines).

Predictions of noise and vibration levels at the receptors will be conducted through a modeling study. The modeling methodology (ISO 9613, US FTA, GIS, FHWA's TNMV2.5 standard) for noise and vibration source will be further detailed in the Impact Study and include, at minimum, information on the methods for identifying, evaluating, and rating adverse effects and determining their significance.

The effects assessment will analyze technically and economically viable mitigation measures to prevent or reduce the negative effects and enhancement measures to further improve positive effects beyond those already built into the design. These measures will be based on industry-standard practices, federal and provincial standard specifications, regulator-mandated measures, best management practices, recommendations from Indigenous communities and the local community, recommendations from industry and environmental professionals with expertise in the area, scientific publications, experience, and judgement.

14.1.3.2 Separation Plant (Sept-Îles project component)

No background noise study is currently available for this site and the surrounding areas. The consideration of noise and vibration effects on the surrounding environment is addressed by Quebec's *Directive 019* (MDDEP, 2012) and by Sept-Îles' zoning regulations n^{o}2007-103 (Ville de Sept-Îles, 2007). It is recommended that the future noise baseline study considers sufficient noise monitoring locations to accurately capture current background noise levels for the larger expected study areas, particularly at any potential noise sensitive locations of concern based on stakeholder consultation. Other recommendations that are consistent with current expected industry best practices include:

- Installing portable wind meters to more accurately capture localized weather effects;
- Measurement time to a minimum of 48 hours, as is typical in longer term monitoring assessments.
- Audio filtering of noise events that aren't typical of background noise levels near the project (e.g. other industrial facilities & transportation activities);
- Inclusion of the full data-set during reporting.

Studies to be carried out:

The field work to be conducted will include baseline noise monitoring at sensitive receptors located within appropriate distance from the planned plant site, such as residences, schools, healthcare facilities, etc. Sensitive receptors will be identified using aerial photography, site visits and consultations with neighbouring communities. Monitoring will be carried out in accordance with provincial guidelines and with current expected best industry practices as in the case of the northern components of the project.

Noise and vibration prediction levels will be established through a modeling study as in the case of the northern component of the project. A similar process will be applied to develop the noise and vibration mitigation measures for the Separation plant.

14.1.4 Geology, Seismic Events and Hazards

14.1.4.1 Geology

14.1.4.1.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The Lac Brisson rare earth deposit (Strange Lake) is associated with the Lac Brisson Pluton (Strange Lake Alkaline Complex or SLAC). The Lac Brisson Pluton is located in the central-eastern part of the Mistinibi-Raude Domain of the Churchill Province (Nain Province for Labrador). It has been dated at 1240 Ma ± 2 Ma by U-Pb dating. The southern, western and northwestern portions of the Lac Brisson Pluton cut the Napeu Kainut Suite (Mesoproterozoic granite and quartz monzonite). To the north, the pluton is in contact with the Mistinibi Complex (migmatitized paragneiss of Paleoproterozoic age). To the northeast and east, the pluton is in contact with gabbronorites of Paleoproterozoic age. In Quebec, these rocks are assigned to the Pelland Suite (intrusive rocks associated with a strong positive aeromagnetic anomaly), while in Labrador they are assigned to the Pallatin intrusive suite. Kilometre-long enclaves of migmatitized paragneiss (diatexite) from the Mistinibi Complex and granoblastic gabbronorite from the Pelland Suite are present, notably to the north-northeast of Pluton (Pilet, 1985 ; Charette et al., 2019 ; Lafrance et al., 2016 ; Miller et al., 1997). Map 13-5 illustrates the SLAC, as well as the rock geology in relation to the site's topography.

Overview: Confirmation of the B Zone Geological and Mineral Resource Model

In 2019, a new geological and mineral resource model was proposed by Torngat Metals for the B Zone mineral resource hosted within the SLAC. This new model was based entirely on historic drill core and assays retrieved between 2009 and 2012. During the summer of 2023, a confirmation drilling program of 33 HQ sized diamond drill holes, totalling 3,067 metres was completed by Torngat Metals. This new drilling program was to test the definitions and continuity of the new criteria used to define the new B Zone geological and mineral resource model, updated in 2019.

The 2023 drill core logging results confirmed the 2019 updated geological and mineral resource and provided additional important criteria for delineating the sub-domains and distribution of the rare earth elements within the B Zone. That information was then integrated into the 2019 geological model to provide an updated characterization. This updated B Zone geological model will be used in preparation for the updated mineral resource model that will be completed in 2024.

The B Zone Geological Model: Summary of Formation

The SLAC is an approximately six-kilometre diameter intrusive complex. It consists of multiple granitic intrusions that are parental rocks to a complex suite of pegmatite intrusions and subsequently altered and injected by hydrothermal fluids. The formation of the pegmatites and hydrothermal mineralization seems to have occurred at a relatively high crustal level, enabling a series of weak, sub-horizontal, pliable (i.e. ductile) to brittle extensional structures near the top of the SLAC. These extensional structures are the primary reasons that the B Zone mineral

resource formed and are the key mechanism and focal point for how the migration and collection of residual granitic fluids, pegmatite formation, and hydrothermal mineralization, occurred. Each of these processes suggest a single paragenetic continuum that can be tracked based on its unique textural, mineralogical, and chemical characteristics. This continuum coincides with an increase in dysprosium within the hydrothermal fracture infillings, making it potentially the highest concentration of dysprosium within a granitic parent worldwide.

Three Mineral Resource domains in the B Zone Extensional Structures

Figure 14-2 depicts the broad irregular area of residual granitic fluid that accumulated and formed a well-defined and large ductile flow, with injection and recrystallization textures inside the granites. These granites are the primary host to the B Zone structures that can be tens of metres wide, and several hundreds of metres long. They occur as a stacked, closely spaced sub-parallel succession of structures, plunging 30 degrees to the northeast. Extending from these larger and well-developed structures are smaller and less continuous structures, found within the variably recrystallized granite. These are typically less than 5 metres wide and less than 25 metres long. The three domains of the B Zone mineral resource seen in Figure 14-4 are: the Granite Domain (GD); the Recrystallized Granite Domain (RGD) with some smaller discontinuous structures; and the continuous extensional structures (i.e. the Structural Domain - SD).

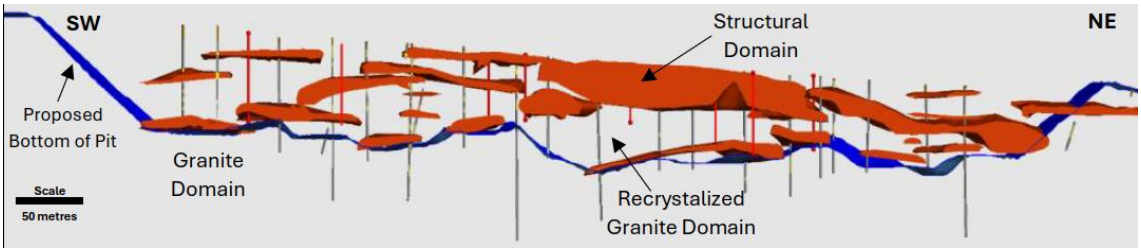


Figure 14-4 : Longitudinal section of the 2019 geological model and mineral resource domains.

Four B Zone Sub-domains capture B Zone's unique variations

In order to capture essential paragenetic and grade variations within the B Zone mineral resource, sub-domains have been determined. The Structural Domain (SD) appears to include at least four sub-domains generally referred to as:

1) recrystallized granite,
2) recrystallized granite,
3) pegmatite and,
4) fracture controlled sub-domains.

The Recrystalized Granite Domain (RGD) includes at least two sub-domains that are simply defined by the absence (recrystallized granite) or presence (enriched recrystallized granite) of narrow pegmatite or fracture-controlled mineralization.

2023 Confirmation Drilling Program: Identifying relationships between Structural and Sub-Domains

As part of the 2023 work program, a portion of the historic remaining split half of BTW sized diamond drill core and the 33 newly acquired 2023 HQ sized diamond drill core were examined to determine the relationships and distribution of the sub-domains within the Structural Domain. Critical textural and mineralogical criteria to differentiate the fracture controlled sub-domain from the other sub-domains in the Structural Domain was readily identified (Table 14-8 and 14-9).

Table 14-8: 1SLAC granite and recrystallized granite domains, pegmatite, and fracture-controlled sub-domains

Minerals	Mineral Formula	Granite Domain		Recrystallized Granite Domain		Pegmatite Sub-Domain		Fracture Controlled Sub-domain	
		Typical Prop %	Typical Size mm	Typical Prop %	Typical Size mm	Typical Prop %	Typical Size mm	Typical Prop %	Typical Size mm
Majors									
Orthoclase	$KAlSi_3O_8$	40	8	20,0	10	15,0	50	-	-
Albite	$NaAlSi_3O_8$	20	8	15,0	10	15,0	50	15,0	0,25
Arfvedsonite	$Na_3(Fe^{2+})_4Fe^{3+}Si_8O_{22}(OH)_2$	20	5	10,0	10	5,0	50	-	-
Quartz	SiO_2	15	3	10,0	4	15,0	25	35 to 40	0,2
Accessories									
Pyrochlore-(Fe, Na, U)	$(Ca,Na)_2(Nb,Ta)_2O_6(O,OH,F)$	tr	0,5	1,0	0,5	-	-	-	-
Narsarsukite	$Na4(Ti,Fe^{3+})_2Si_8O_{20}(O,F)_2$	1	1	0,2	0,5	-	-	-	-
Magnetite	Fe_3O_4	tr	0,2	tr	0,2	-	-	-	-
Thorite	$(Th,Fe^{3+},U)SiO_4$	tr	0,2	tr	0,2	tr	0,2	-	-
Elpidite	$Na_2ZrSi_6O_{15}$-3H2O	1	0,25	2,0	0,5	0,5	10	-	-
Rutile	TiO_2	0,1	0,2	0,1	0,25	0,2	0,5	-	-
Apatite	$Ca_5(PO_4)_3(F,Cl,OH)$	tr	0,05	tr	0,1	-	-	-	-
Alteration									
Epidote	$Ca_2(Al_2Fe^{3+})(Si_2O_7)(SiO_4)O(OH)$	0,1	0,1	2,0	0,2	3,0	0,25	-	-
Hematite	Fe_2O_3	0,2	<0.1	0,5	<0.1	1,0	0,25	-	-
Chlorite	$Mg_8FeSi_5.3Al_5.5O_{20}(OH)_{16}$	0,1	0,2	0,5	0,1	2,0	0,1	-	-
Zircon	$ZrSiO_4$	0,1	0,2	3,0	0,25	3,0	0,1	-	-
Titanite	$CaTiSiO_5$	0,5	0,2	0,5	0,1	1,0	0,1	-	-
Ankerite	$Ca(Fe,Mg,Mn)(CO_3)_2$	tr	0,2	0,5	0,1	1,0	0,25	-	-
Calcite	$CaCO_3$	tr	0,1	0,5	0,1	1,0	0,1	-	-
Phyllosilicates	$(K,H)Al_2(Si,Al)_4O_{10}(OH)_2$-$xH_2O$	0,2	0,1	0,5	0,1	2,0	0,1	-	-
Astrophyllite	$(K,Na)_3(Fe^{2+},Mn)_7(Ti_2Si_8O_{24}(O,OH)_7$	0,1	0,1	0,5	0,1	1,0	0,1	-	-
Open Space Infillings									
Fluorite	CaF_2	0,1	0,25	2,0	0,5	3,0	2	1 to 30	1
Hematite	Fe_2O_3	0	<0.1	2,0	<0.1	2,0	<0.1	1 to 30	<0.1
Sulphides									
Sphalerite	(Zn,Fe)S	tr	0,1	tr	0,1	tr	0,1	tr to 0.1	0,1
Galena	PbS	tr	0,1	tr	0,1	tr	0,1	tr to 0.1	0,1
Chalcopyrite	$CuFeS_2$	tr	0,1	tr	0,1	tr	0,1	tr to 0.1	0,1
LREE - "Primary"									
Monazite-(Ce,La)	$(Ce,La,Nd,Th)PO_4$	0,1	0,25	0,5	0,25	2,0	0,5	-	-
Allanite-(Ce,La)	$(REE,Ca)_2(Al,Fe^{2+},Fe^{3+})_3(SiO_4)3(OH)$	0,1	0,25	0,5	0,25	3,0	0,5	-	-
Epidote-(REE)	$(Ce,Ca,Y)_2(Al2Fe^{3+})_3(SiO_4)_3(OH)$	0,1	0,25	0,5	0,25	5,0	0,25	-	-

Table 14-8: SLAC granite and recrystallized granite domains, pegmatite, and fracture-controlled sub-domains (cont'd)

Minerals	Mineral Formula	Granite Domain		Recrystallized Granite Domain		Pegmatite Sub-Domain		Fracture Controlled Sub-domain	
		Typical Prop %	Typical Size mm	Typical Prop %	Typical Size mm	Typical Prop %	Typical Size mm	Typical Prop %	Typical Size mm
Alteration									
Hematized Arfvedsonite	$Na_3(Fe^{2+})_4Fe^{3+}Si_8O_{22}(OH)_2$	-	-	10,0	1	5,0	10	5,0	1
Aegirine	$NaFe^{3+}(Si_2O_6)$	-	-	10,0	1	5,0	10	5,0	1
Gittinsite	$CaZrSi_2O_7$	0,2	0,5	5,0	1	5,0	5	-	-
Dalyite	$K_2ZrSi_6O_{15}$	tr	0,2	0,2	0,2	0,2	1	-	-
Armstrongite	$CaZrSi6O_{15}$-$3H_2O$	tr	0,2	0,2	0,2	0,2	1	-	-
Vlasovite	$Na_2ZrSi_4O_{11}$	tr	0,2	0,2	0,2	0,3	1	-	-
LREE - "Secondary"									
Bastnaesite-(Ce,La,Nd)	$(La,Ce,Nd,Pr,Y)CO_3F$	tr	0,2	0,5	0,2	0,5	0,2	3,0	0,2
Parasite	$Ca(Ce,La)_2(CO_3)_3F_2$	tr	0,1	0,1	0,1	0,2	0,1	1,0	0,1
Britholite-Ce	$(Ce,Ca)_5(SiO_4)_3OH$	tr	0,1	0,1	0,1	0,2	0,1	1,0	0,1
HREE - "Primary"									
Kainosite-Y	$Ca_2(Y,Ce)SiO_4O_{12}(CO_3)$-$(H_2O)$	tr	0,1	0,1	0,2	0,2	0,5	0.5 to 5	0,5
Gerenite-Y	$(Ca,Na)_2(Y,REE)_3Si_6O_{18}$-$2H_2O$	tr	0,1	0,1	0,2	0,2	0,25	0.5 to 3	0,25
Gadolinite (Ytterbite)	$(Ce,La,Nd,Y)_2FeBe_2Si_2O_{10}$	tr	0,1	0,1	0,2	0,2	0,25	0.5 to 2	0,25
Fergusonite-(Y)	$(Y,REE)NbO_4$	tr	0,1	0,1	0,2	0,1	0,25	0.1 to 1	0,25
Thalenite-Y	$(Y, Dy)_3Si_3O_{10}F$	tr	0,1	0,1	0,2	0,1	0,2	0.5 to 2	0,5
Allanite-(Y, REE)	$(Ce,Ca,Y)_2(Al_2Fe3+)_3(SiO_4)_3(OH)$	tr	0,1	0,5	0,2	2,0	0,2	0,5	0,2
Britholite -Y	$(Y,Ca)_5(SiO_4,PO_4)_3(OH,F)$	tr	0,1	0,1	0,2	0,2	0,2	0.5 to 1	0,2
Yttrialite	$(Y,Th)_2Si_2O_7$	tr	0,1	0,1	0,2	0,1	0,2	0,5	0,2
HREE Accessories									
Milarite-(Y)	$K(Ca,Y)Be_3Si_{12}O_{30}$	tr	0,1	0,1	0,2	0,1	0,2	0,2	0,2
Yttrofluorite (Dy)	$(Ca,Y)F_2$	tr	0,1	0,1	0,2	0,1	0,2	0,2	0,2
Keiviite-Y	$Y_2Si_2O_7$	tr	0,1	0,1	0,2	0,1	0,2	0,2	0,2
Gargarinite-(Y)	$NaCaY(F,Cl)_6$	tr	0,1	0,1	0,2	0,1	0,2	0,2	0,2
	Total	**99,0**		**100,2**		**100,8**		**31,8**	

Table 14-9 : Chemical data 2019 SLAC granite, recrystallized granite and the pegmatite/recrystallized granite fracture controlled sub-domains of the fracture-controlled domain

Domain or Sub-Domain	Average Width	Dy	Tb	Nd	Pr	Zr	Y	Nb_2O_5	F
	m	ppm	ppm	ppm	ppm	ppm	ppm	%	%
Granite (D)	8,29	894	122	1530	424	19389	5670	0,42	1,21
Recrystallized Granite (D)	7,99	441	62	1026	286	19759	2835	0,29	0,90
Enriched ReXst-Gte (SD)	8,31	351	50	990	272	15819	2174	0,21	0,60
Fracture-controlled (SD)	19,28	261	39	894	244	13478	1594	0,16	0,48

Domain or Sub-Domain	Average Width	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	Na_2O	TiO_2
	m	%	%	%	%	%	%	%
Granite (D)	8,29	69,34	5,99	3,68	5,78	3,44	1,80	0,68
Recrystallized Granite (D)	7,99	69,42	6,95	2,92	5,97	3,73	2,41	0,58
Enriched ReXst-Gte (SD)	8,31	70,04	7,80	2,30	6,21	3,84	3,02	0,42
Fracture-controlled (SD)	19,28	70,53	8,29	1,86	6,30	3,94	3,39	0,33

The recent, detailed examination of the sub-domains within the Structural Domain, indicates that only the recrystallized granite and a more limited extent of miarolitic pegmatites (texture where the pegmatite present crystals filled cavities), had formed in place. Even though miarolitic pegmatites are present within the Structural Domain, most of these pegmatites were probably injected as a partially crystallized pegmatite pulp. And after the pegmatite pulp injected stage, a third and final stage of pegmatite mineralization took place. Once this third stage was complete, the extensional forces driven by the SLAC cooling and contraction transitioned from pliable to brittle. The brittle extensional forces formed multiple fractures that were infilled by hydrothermal fluids, creating what is now generally referred to as the *'fracture controlled sub-domain of the B Zone'*. Particular focus was given to the fracture controlled sub-domain because of its strong correlation with late stage fracture infillings of hematite and associated relatively high-grade heavy rare earth element (HREE) mineralization. The most important outcome of the 2023 drilling and the resulting interpretation was the fracture controlled sub-domain appearing to be more contiguous than what was thought in 2019 (Figure 14-5).

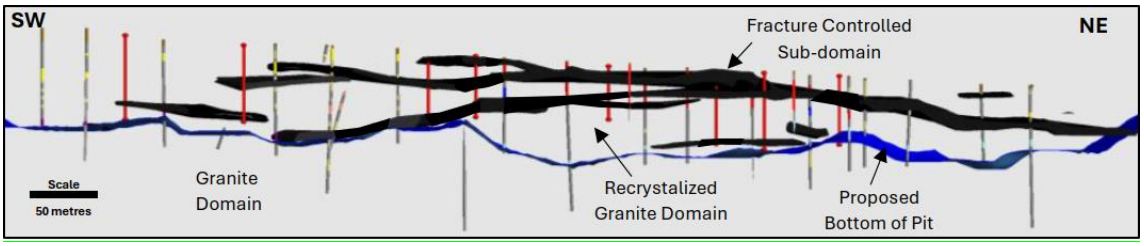


Figure 14-5 : 2023 Update interpretation of the fracture-controlled B Zone sub-domain

The Light and Heavy Rare Earth Elements in B Zone Sub-domains

The fracture controlled sub-domain is the most important of the B Zone mineral resource. Owing to a unique paragenetic phenomenon within the SLAC formation, light rare earth elements (LREE) are within the granitic and pegmatitic processes related to ductile extensional structures. HREEs are mostly controlled by hydrothermal fluids that infilled the brittle structures. As a result, the B Zone geological and mineral resource model needed to incorporate the bimodal rare earth element (REE) enrichment processes.

Conclusion and Outcomes from the 2023 confirmation Program

The 2023 confirmation drilling program demonstrated that recrystallized granite was in fact the primary host into which the pegmatite crystal pulp was injected along pliable extensional structures followed by hydrothermal fluids infillings along brittle extensional structures.

The same program revealed that the fracture controlled sub-domain is a relatively continuous set of extensional fractures rather than an infilling of hematite and high-grade HREE mineralization through inward crystallization of miarolitic pegmatites. These extend through and between the previously formed ductile structures and along almost the entire longitudinal length of the B Zone mineral resource (Figure 14-5). The recrystallized granite within the fracture was probably a relic host now present as extensively altered and recrystallized blocks that were cut by brittle fractures and infilled by hydrothermal fluids. Since the extensional force was a common and continuous aspect of the formation of the B Zone, much of the observed complexities in textures, mineralogy, and chemistry is now effectively understood.

Geostatistical modeling in 2019 suggested that the diagnostic hematite and high-grade HREE mineralization found in the Structural Domain could be preferentially extracted during the initial years of the mine life. The 2023 drilling program delivered an important understanding of the B Zone's primary control and ability to produce a more comprehensive geological model and significantly improved economic model for the SLAC B Zone. By defining the extent and continuity of the structural sub-domain, it becomes possible to selectively mine the high-grade HREE during early mining years, which could offer a significant economic advantage to the project.

Impact on the composition of material and waste rock

The main lithologies hosting REE mineralization are pegmatite and granite. From this, the main composition of the material and rocks will be pegmatite and granite. Even after leaching, the residual material preserves its granitic nature (Terrapex, 2013). The results of the geochemical and mineralogical testing, listed at the Appendix D, will give more information on the composition of the material, waste rock and tailings of the process. Those results will be presented in the Environmental impact assessment.

The road will cross The Southeastern Churchill Province as well as the Nain Province before arriving at the bay (Anaktalak Bay for Option A or Voisey's Bay for Options C1 et C2). The general bedrock geology along the road is mostly Paleoproterozoic to Mesoproterozoic. Principal rocks are metamorphic (gneisses, migmatite) and igneous (granite, granodiorite and granitoid). Numerous remnants glacial features are present at the surface.

14.1.4.1.2 Separation plant (Sept-Îles Project Component)

The region of Sept-Îles is situated in the Grenville Province. The general bedrock geology is mostly Cambrian to Paleoproterozoic/Mesoproterozoic. Principal rocks are metamorphic (gneisses, migmatite) and igneous (anorthosite, gabbro, nelsonite, dunite).

14.1.4.2 Seismic Events

14.1.4.2.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities, Port Facilities (northern project components)

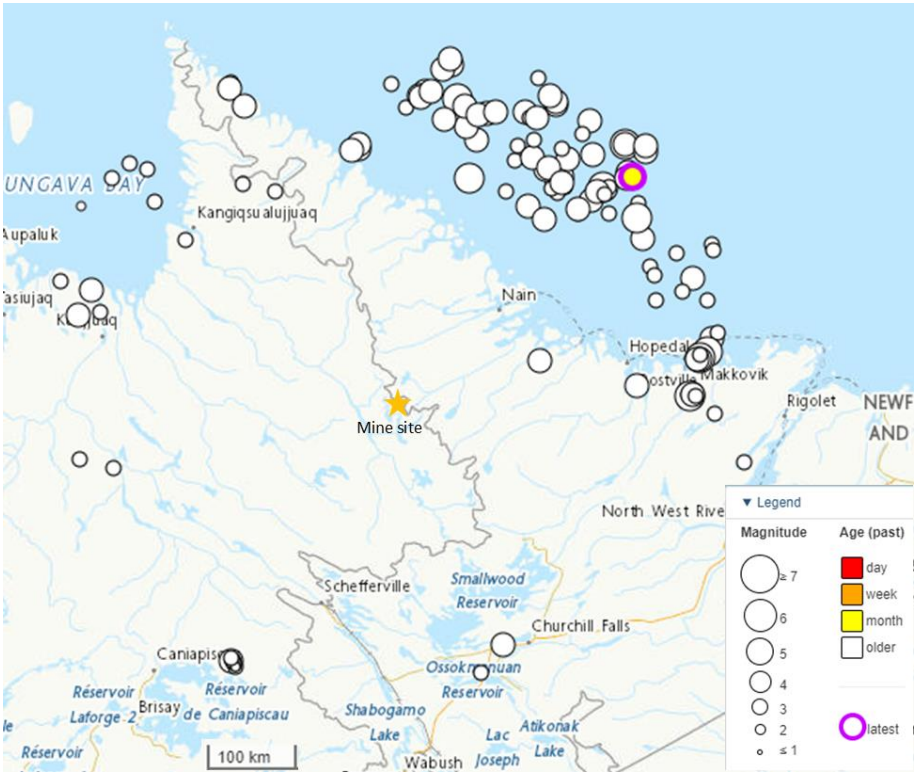


Figure 14-6: Major seismic events in a 400 km radius from the mine site since 1985[13].

[13] https://www.seismescanada.rncan.gc.ca/stndon/NEDB-BNDS/bulletin-en.php - consulted 03/04/2024

The closest seismographs from the mine site, road and port are situated in Nain (NINL station), Schefferville (SCHQ station) and Kuujjuaq (KUQ station). Although earthquakes might occur throughout Canada, the region, both in the Quebec and Labrador province is not known for high seismic activity (Government of Canada, 2023). Figure 14-6 shows the historical seismicity, since 1985, in a 400 km radius from Lac Brisson, 133 seismic events occurred, the majority being in the Labrador Sea. The great majority of those events were equal or less than magnitude 3.

14.1.4.2.2 Separation Plant (Sept-Îles project component)

Sept-Îles is located in the Lower St. Lawrence Seismic zone (LSZ), also referred as "Lower-St. Lawrence-Quebec North Shore" which is a seismically active region of eastern Canada. While the region is active, and unlike the Charlevoix Seismic zone, no large earthquake has been reported or recorded in the LSZ (Natural Resources Canada, 2024a). On average about 60 events are recorded annually. The region is monitored by several seismograph: Ste-Marguerite (SMQ station), Islets-Caribou (ICQ station), Manicouagan (MNQ station), Cote-Nord (CNOQ station), Sainte-Felicite (SNFQ station), Port-Meunier Anticosti (PMAQ station). Since 1985 (Figure14-7) the majority of the seismic events are in the St. Lawrence River and were less than magnitude 4. In the LSZ, the most recent events that was more than magnitude 4 was on September 21, 2013, an earthquake of magnitude 4.6 occurring at 48 km south from Moisie. The other one was on March 16, 1999. It was an earthquake of magnitude 5.1 occurring about 60 km south of Sept-Îles.

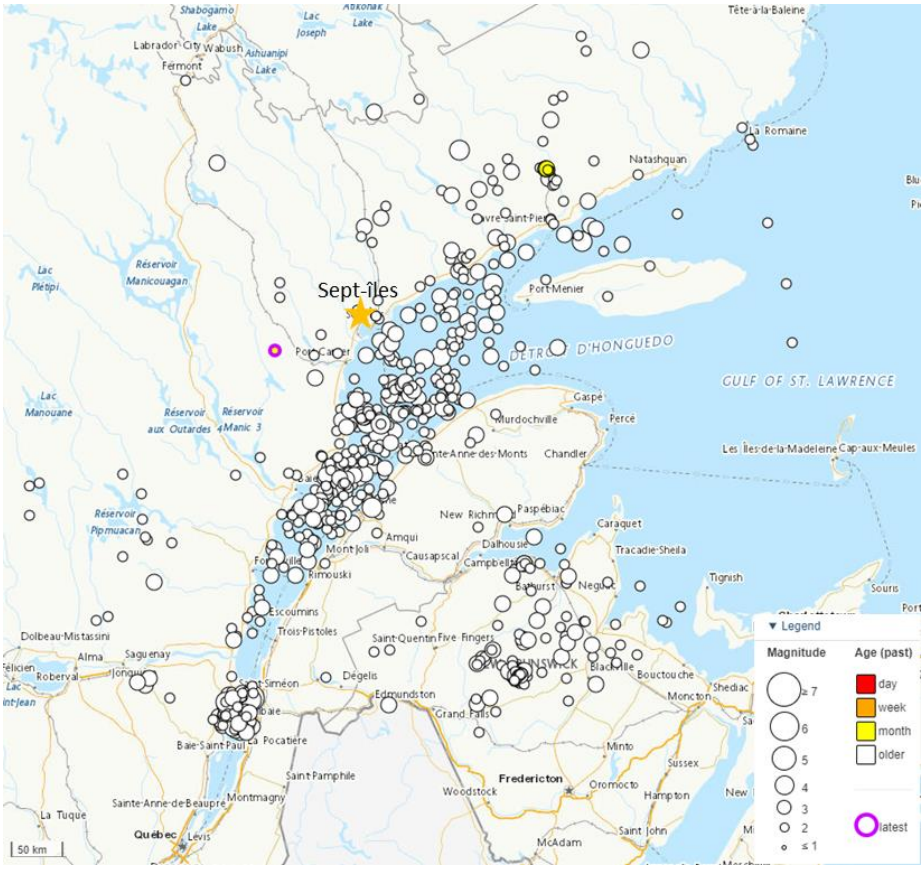


Figure 14-7 : Major seismic events in a 400 km radius from Sept-Îles since 1985[14].

[14] https://www.seismescanada.rncan.gc.ca/stndon/NEDB-BNDS/bulletin-en.php - consulted 07/10/2023

14.1.4.3 Seismic Hazards

Although earthquakes occur in all regions of Canada, certain areas have a higher probability of experiencing damaging ground motions caused by earthquakes. The map shown below (Figure 14-6) is derived from a simplified map of the National Building Code of Canada seismic hazard map for spectral acceleration at a 0.2 second period (Natural Resources Canada, 2024a). It shows the ground motions that might damage one- to two-storey buildings for the province of Quebec with the localization of the mine site and the separation plant in Sept-Îles.

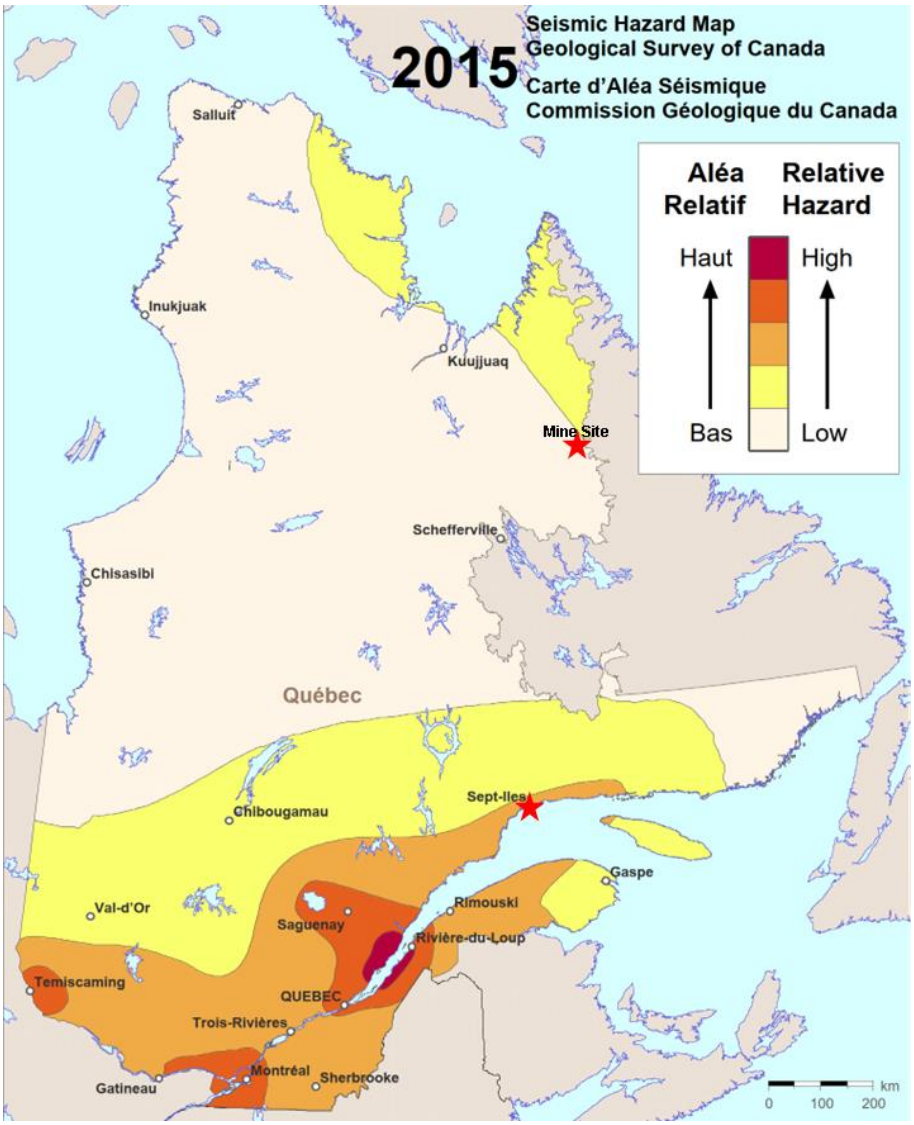


Figure 14-8 : Localization of the mine site and Sept-Iles on the seismic hazard map (modified from Natural Resources Canada, 2024a).

As shown in the Figure 14-8, the mine site is situated in the zone with low relative hazard while the city of Sept-Îles is in a zone of higher relative hazard. The probability of shaking strong enough for significant damage within towns of these regions is at least a 30 per cent chance every 50 years for the highest hazard (Natural Resources Canada, 2024b). For the region of moderate hazard, the chance of significant damage is a 5 to 15 per cent every 50 years. Finally, for the lowest hazard, the risk is less than 1 per cent chance in 50 years (Natural Resources Canada, 2024a). The separation plant in Sept-Îles would be in a zone with chance close to 30 per cent, while the mine site is in the lowest zone with less than 1 per cent chance.

The Figure 14-9 compare seismic hazards for a few selected locations in the province of Quebec. Although Sept-Îles is in a high seismic hazard zone, the actual values for the city are rather low (Natural Resources Canada, 2024c).

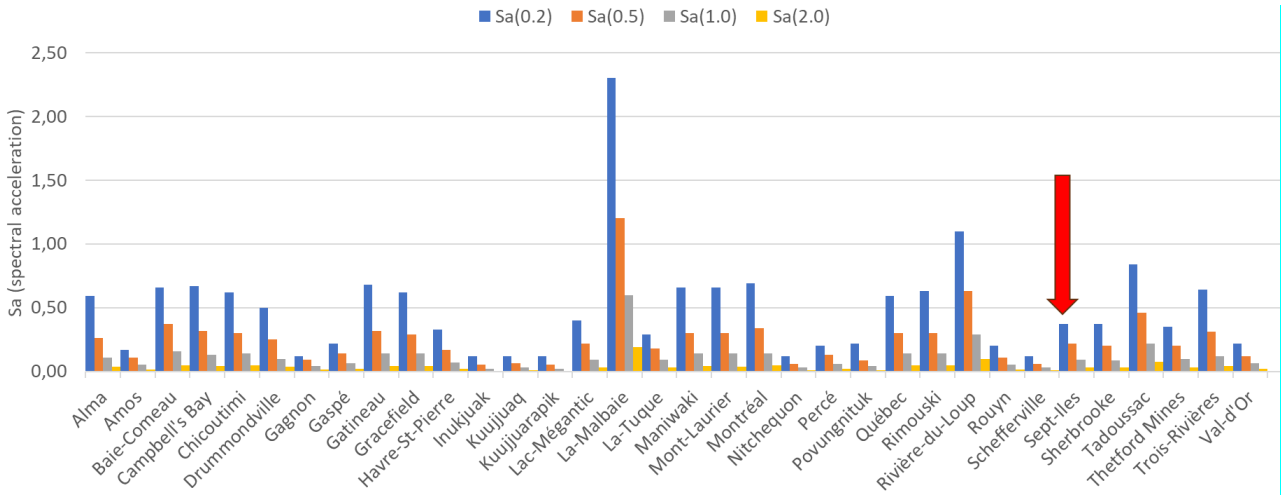


Figure 14-9: Seismic hazard values intended for the 2005 NBCC "Design Data for Selected Locations in Canada" table. Sa : spectral acceleration given in units of g (acceleration due to Earth's gravity).

Seismic Hazards are mapped for given site conditions as specific site conditions might increase or decrease the hazard. Also, in general older buildings are more vulnerable than new ones.

The precise values of the hazard for individual sites, specifically the mine site and the plant separation in the city of Sept-Îles, are determined from the 2020 National Building Code of Canada Seismic Hazard Tool (Natural Resources Canada, 2024d) and presented below:

14.1.4.3.1 Strange Lake Mine and Concentration Plant Site Seismic Classification

The seismic data are from the 2020 National Building Code Interpolated Ground Motion Values with 2% probability of exceedance in 50 years or 0.000404 per annum. The 2.5%- to 40%-in-50-year values are provided for additional checks in accordance with Article 4.1.8.23. of the NBC 2020. The 5%-damped spectral acceleration (Sa(T), where T is the period, in s) and peak ground acceleration (PGA) values are given in units of acceleration due to gravity (g, 9.81 m/s2). Peak ground velocity (PGV) is given in m/s. Probability is expressed in terms of percent (%) exceedance in 50 years.

Table 14-10: Ground Motion Values[15]

Probability (% in 50 years)	Sa (0.2) [g]	Sa (0.5) [g]	Sa (1.0) [g]	Sa (2.0) [g]	Sa (5.0) [g]	Sa (10.0) [g]	PGA [g]	PGV [m/s]
2	0.108	0.0682	0.0394	0.0198	0.00549	0.00213	0.0441	0.046
5	0.0629	0.0412	0.0233	0.0113	0.00288	0.00114	0.0257	0.0255
10	0.0398	0.0265	0.0145	0.00673	0.00159	0.000628	0.0163	0.0152

[15] 2020 National Building Code of Canada Seismic Hazard Tool– (www.canada.ca), March 15, 2024

14.1.4.3.2 Sept-Îles Separation Plant Site Seismic Classification

The seismic data are from the 2020 National Building Code Interpolated Ground Motion Values with 2% probability of exceedance in 50 years or 0.000404 per annum. The 2.5%- to 40%-in-50-year values are provided for additional checks in accordance with Article 4.1.8.23. of the NBC 2020.

The 5%-damped spectral acceleration (Sa(T), where T is the period, in s) and PGA values are given in units of acceleration due to gravity (g, 9.81 m/s2). PGV values are given in m/s. Probability is expressed in terms of percent (%) exceedance in 50 years.

Table 14-11: Ground Motion Values[16]

Probability (% in 50 years)	Sa (0.2) [g]	Sa (0.5) [g]	Sa (1.0) [g]	Sa (2.0) [g]	Sa (5.0) [g]	Sa (10.0) [g]	PGA [g]	PGV [m/s]
2	0.362	0.166	0.081	0.0367	0.00957	0.00347	0.198	0.111
5	0.202	0.0947	0.0457	0.0202	0.00498	0.00183	0.108	0.06
10	0.123	0.0592	0.0282	0.0121	0.00281	0.00104	0.0633	0.0355

14.1.5 Surface geology, geomorphology, and permafrost

The basic conditions regarding surface geology, geomorphology, and permafrost in the northern components environment have been assessed and described based on existing data, a field survey conducted in 2011, and the examination and interpretation of available aerial photos, including a high-resolution orthophotography (with a ground resolution of 15 to 25 cm) covering the mine area, produced in September 2012. As further explained in the coming sections, this data will be updated as part of the baseline studies to be conducted in 2024.

The conditions prevailing in the separation plant site environment in Sept-Îles have been assessed based on existing data in the literature. The following paragraphs summarize the information obtained within the scope of these surveys.

14.1.5.1 Surficial Geology and Geomorphology

14.1.5.1.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The Strange Lake region is characterized by a rocky plateau with a gentle slope towards the lowlands of Ungava Bay. This plateau has an average elevation of 460 m and is traversed by the George River. The regional morphology is controlled by different glacial phases, as well as the Naskaupi glacial dam lake (Dubé-Loubert *et al.*, 2016). The entire study area was covered by the Laurentide Ice Sheet during the last phase of the Wisconsinan glaciation. The mine site is covered by a thick layer of glacial deposits consisting of basal till overlain by ablation till. The till has a grayish matrix composed of silt and sand with some clay and contains centimeter to millimeter-sized clasts (Dubé-Loubert *et al.*, 2016). This region is characterized by the presence of several typical glacial landforms oriented east-northeast/west-southwest, parallel to the glacial flow: roche moutonnée (asymmetric bedrock bumps or hills also called sheepback), drumlins, and crag and tail formations. Rogen moraines are also found, which appear as till ridges arranged perpendicular to the glacier flow. A thin layer of organic material generally covers the till. Surface drainage is poor on the till, especially in depressions between the drumlinoid ridges. Glaciers have also left behind fluvio-glacial deposits forming wide, visible bands in the study area. The presence of kames and kettles, as well as eskers forming long sinuous ridges in the landscape, is typical of this region. The thickness of the eskers varies between 5 and 25 m (Micon, 2019). They are generally composed of fluvio-glacial sands and gravels with some embedded cobbles. A glacial dispersal train over 40 kilometers long downstream of the deposit can also be observed (Dubé-Loubert *et al*., 2016).

[16] 2020 National Building Code of Canada Seismic Hazard Tool– (www.canada.ca), Mar 15th, 2024

Numerous remnant glacial features are present at the surface along the road. Towards the east of the road plateau segment, the till becomes thinner, poorly drained areas are less common, and higher relief rocky outcrops are more prevalent. Glaciofluvial sand and gravel deposits dominate the valley along Ikadlivik Brook, and are also important around Reid Brook and Little Reid Brook.

14.1.5.1.2 Separation Plant (Sept-Îles project component)

The separation plant in Sept-Îles will be located in an area designated for industrial usage. According to Dredge (1971), the region of Sept-Îles can be divided into two major physiographic units, the Laurentian foreland and the Champlain plain. A well-defined escarpment, about 65 m high, separates the two zones. The upland is a prominent chain of low hills, having a mean elevation of about 150 m. Large quantities of sandy till and out-wash were deposited by glaciers which overrode the area. These sediments have infilled former valleys and hillsides, producing a surface of subdued relief. The lower surface is a sand and clay plain built by recent coastal processes. Although elevations range from 0 to 60 metres, the region is almost flat; most of the relief is taken up as small scarps associated with strandlines and river terraces which mark positions of former sea levels.

Surficial deposits in the region were mapped by Dredge (1983). Terrestrial and subaqueous moraine systems, eskers and glacial striations are present. In the highlands, various types of till rest on bedrock with numerous outcrops. Marine deposits from the Goldthwait Sea outcrop in several places along the coast and downstream of structural valleys: in areas eroded by the sea, rivers and landslides (Gagnon-Poiré, 2016). At the mouths of major valleys, large marine deltaic sequences (juxtaglacial outwash cones) are observed (Dredge, 1983), topped by littoral deposits. On the thin coastal fringe, there are beach ridges installed during the marine invasion and retreat, and numerous peat bogs. Rivers remobilize ancient marine deltaic, fluvio-glacial, lacustrine and modern fluvial deposits (Gagnon-Poiré, 2016).

14.1.5.2 Permafrost

14.1.5.2.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities, Port Facilities (northern project components)

The mine site is located in a discontinuous permafrost zone (areas where the soil presents a 30% to 80% proportion of frozen ground) where the ground remains permanently frozen beneath the surface on at least 50% of the land area. In this zone, glacial deposits (till) contain moderate interstitial ice (Allard et al., 2020) and the temperature at the top of the ground is above -2°C (Allard et al, 2020 ; L'Hérault et Allard, 2018). In the report from L'Hérault and Allard (2018) the permafrost depth in this zone would be 150 m and less. Several landforms typically associated with the presence of permafrost are present in the study area. These include extensive frost boils, polygonal ground areas, cryogenic mounds, and thermokarst lakes. The presence of some of these thermokarst lakes suggests that permafrost degradation is occurring locally within the project area. The thermal regime of the soil is dynamic and sensitive to changes that affect soil properties, surface cover (including snow), climate, and groundwater. Recent studies have shown that the thickness of the active layer appears to be deepening due to climate change (Allard et al., 2018).

Along the road, the plateau region corresponds to a zone of extensive discontinuous permafrost, the Ikadlivik valley has sporadic permafrost.

Studies to be carried out:

As part of the impact assessment, an evaluation of the permafrost will be conducted in accordance with the procedures contained in Canadian Standards Association published CSA 4011, "Infrastructure in Permafrost: A Guideline for Climate Change". This document provides guidance and practical advice on location and design for infrastructure in northern environments. The document describes the nature of permafrost, trends in climate change, foundation systems for community infrastructure, and presents a process for ensuring climate change is incorporated into design and location decisions.

14.1.5.2.2 Separation Plant (Sept-Îles project component)

There is no permafrost in Sept-Îles and as such, Sept-Îles is excluded from these surveys.

14.1.5.3 Fluvial Geomorphology and Hydrology

14.1.5.3.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities, Port Facilities (northern project components)

Water is omnipresent in the northern Quebec and Labrador landscape. The mine site is characterized by the presence of lakes, wetlands, and tributaries that drain the area over impermeable frozen substrates, dense basal till, or shallow till to bedrock. Approximately 80% of the mine site's area drains towards Lake Brisson, which waters, after flowing through Lake Napeu Kainiut, discharge into the Deat River watershed and ultimately leads to the George River (approximately 100 km downstream; Map 14-1).

Besides the Napeu Kainuit watershed at the mine site (Déat River), the Kogaluk River, the Konrad Brook, the Ikadlivik Brook, the Toma Brook, the Reid Brook and Little Reid Brook watersheds are the watersheds along the road corridor in Labrador and LIL (Options A and C1 and C2).

The access road from the mine site to the eastern Labrador crosses a significant number of aquatic features. Appendix E illustrates all of water crossings along the alignments. A common alignment is considered for all options (Option A, Option C1, Option C2) of the access road currently assessed. The common alignment is for the 18 km located in the Québec Province. A total of 13 water crossings are observed (Table 14-7). These were assessed in 2023 (aerial photos are available at Appendix E).

From the Labrador border, along the Option A of the access road, leading to Anaktalak Bay, 273 river and streams are known to be crossing the alignment based on aerial and ground validations made in 2011-2014, and in 2023 (highly precise mapping). Along the Option C2 of the access road, a total of 298 water crossings are found in Labrador leading to Voisey’s Bay, based on precise satellite 3D image analysis (50 cm resolution). Finally, along the Option C1, with a reduced precision on desktop assessment (scale 1:50,000 mapping), a minimum of 113 water crossings are found along the access road. It is noteworthy that this number should not be compared on a 1:1 ratio with the two other options as the scale of assessment is differing significantly.

For all options, most of the crossings have a drainage area less than 2 km^2. For Option A, validations (aerial and ground) surveys confirmed that more than 50% of water crossings are of intermittent flow (Table 14-12). With Option C, where no validations are available yet, assessment is made through desktop drainage analysis.

Culverts of lesser dimensions would be installed to cross the remaining smaller intermittent and permanent streams. The dominant watercourse substrate type is coarse; with erosion-sensitive materials surrounding about one third of the water crossings.

Studies of baseline conditions in the field will continue in 2024, particularly regarding Option C of the road. Section 14.2.2 details the fish and fish habitat (FAFH) characterization.

In Option A, the road corridor crosses three major water crossings associated with three major watersheds, from west to east: on the Kogaluk River, on the Ikadlivik Brook, and on the Reid Brook. The crossing on the Kogaluk River has a drainage area of 1,661 km^2, the one on the Ikadlivik Brook watershed has a drainage area of 183 km^2 and finally the one on the Reid Brook has a drainage area of 98 km^2.

Table 14-12: Number of water crossings along the current road alignments by Province.

Flow type	Total	Classification			
		Class A	Class B	Class C	Class D
Upstream Drainage from water crossing		< 2 km^2	> 2 and < 4 km^2	> 4 and < 10 km^2	> 10 km^2
OPTION A-C1-C2 -Common alignment in Québec (18 km)					
Total Number of Watercourse crossings by Classification in Québec	13	9	2	2	0
OPTION A (leading to Vale's Port) (172 km total)					
Total Number of Watercourse crossings by Classification in Labrador	273	242	12	19	0
OPTION C1 (leading to Voisey's Bay) – Scale 1:50,000 (168 km total)					
Total Number of Watercourse crossings by Classification in Labrador	113	90	10	6	7
OPTION C2 (leading to Voisey's Bay) – 3D Photos (188 km total)					
Total Number of Watercourse crossings by Classification in Labrador	298	267	10	10	11

In Option C1, the Kogaluk Brook crossing will be the same as the one on Option A (#116; Bridge 1). The two other main crossings are associated with the following watersheds (from west to east): Konrad Brook watershed with a drainage area of 102 km^2 and Toma Brook watershed with a drainage of 42 km^2. Option C2 has the same rivers and streams. However, a higher number of major water crossings would be involved, such as two crossings on the Konrad Brook.

14.1.5.3.2 Separation Plant (Sept-Îles project component)

The separation plant in Sept-Îles will be located in an area designated for industrial usage. However, the Au Foin River, a tributary of the Bay of Sept-Îles does cross the proposed area of the plant. A potential obstacle is mapped at the entrance of the tributary (CRECN, 2016; Map 14-2). A complete investigation of the site will be completed as part of the impacts assessment.

14.1.6 Hydrogeology

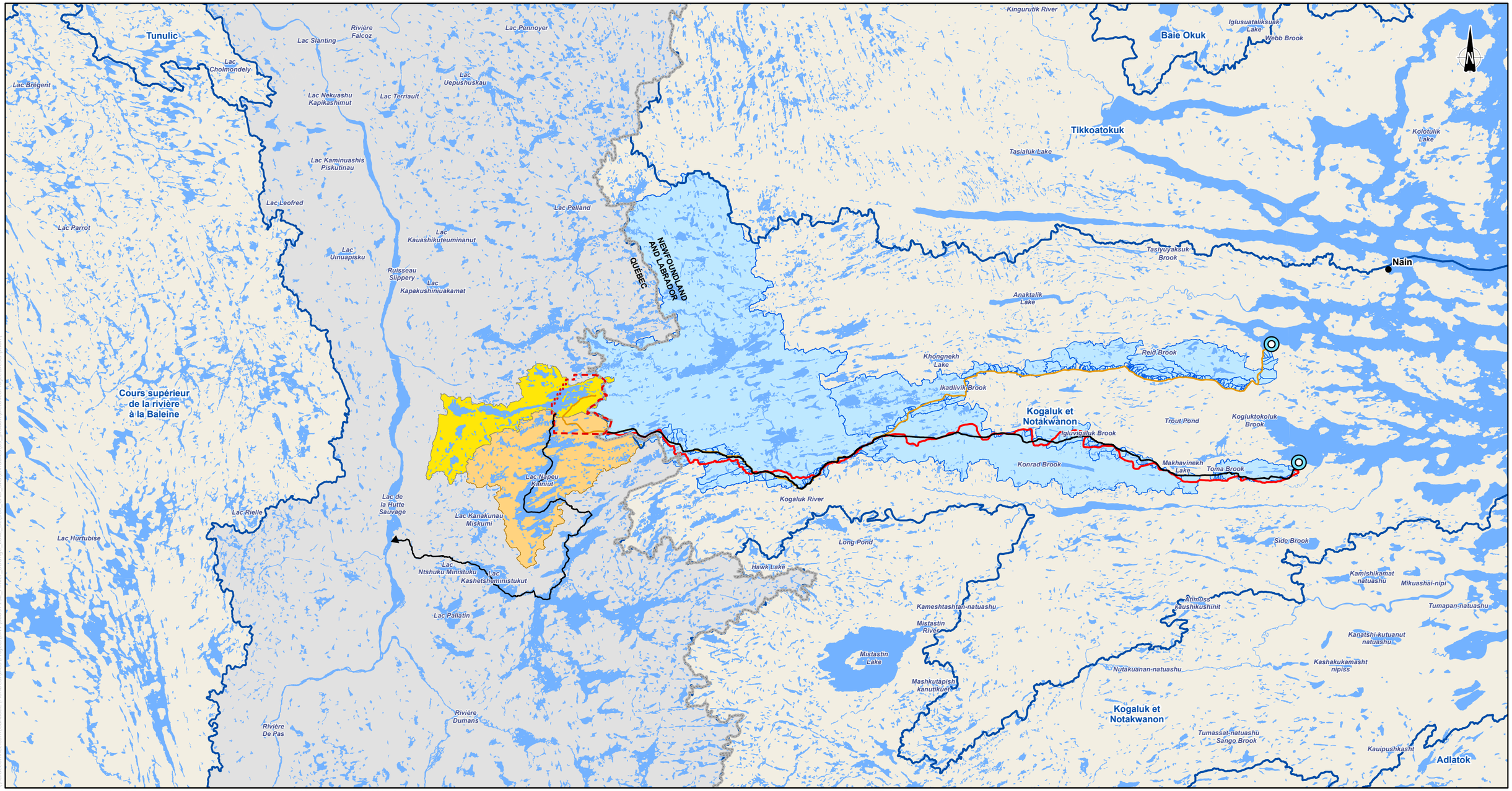
14.1.6.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

An assessment of groundwater conditions was conducted at the mine site in 2011 and 2012 (AECOM, 2013b). Based on observations from borehole logs and permeability tests, three hydrostratigraphic units have been identified:

- The groundwater elevation is typically within 1 - 2 m of the surface. The hydraulic conductivity of the undifferentiated overburden ranges from 4.7 x 10^{-7} to 1.5 x 10^{-4} m/s. The hydraulic conductivity of the till varies vertically and from site to site due to lateral and vertical heterogeneity in grain size and soil texture. Groundwater flow is also restricted by the presence of permafrost in till.
- The esker aquifer is composed of well-sorted, coarse-grained sediments. The hydraulic conductivity of the esker aquifer is high, ranging from 5.6 x 10^{-6} to 1.2 x 10^{-3} m/s. Groundwater elevations are 5 – 10 m below surface. The esker aquifer represents a potential source of potable water where the groundwater quality meets criteria for potable water but should be further evaluated for quality and yield prior to use.
- A fractured bedrock aquifer is present beneath the site, in the upper 2 to 4 meters where permeability tests suggest hydraulic conductivity values in the range of 8.0 x 10^{-7} m/s to 4.0 x 10^{-4} m/sec. Frozen groundwater has been encountered in many deep boreholes advanced into bedrock and in many monitoring wells installed in the upper several meters of bedrock, suggesting very low groundwater flow into the bedrock where it is frozen.

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composantes du projet / Project Components

- Limite des concessions d'exploration minières détenues par Métaux Torngat / Outline of Torngat Metals Mineral Exploration Claims
- Site potentiel des installations portuaires / Potential site for Port Facilities

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Hydrographie / Hydrography

- Trajet de l'écoulement du lac Brisson à la rivière George / Water flow from Brisson lake to George river
- Bassin versant / Watershed
- Bassin versant de la Rivière George / George River Watershed
- Sous-bassin versant du lac Brisson / Brisson lake sub-watershed
- Sous-bassin versant du lac Napeu Kainiut / Napeu Kainiut lake sub-watershed
- Sous-bassin versant de la route d'accès / Access Road Sub-Watershed

Autre / Other

- Frontière Québec et Labrador / Quebec and Labrador border

1:700 000

0 10 20 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic data: RNCan (2022)
Bassin versant / Watershed: National Hydro Network, RNCan (2023)

Carte 14-1
Bassins versants dans la zone du projet au Nord

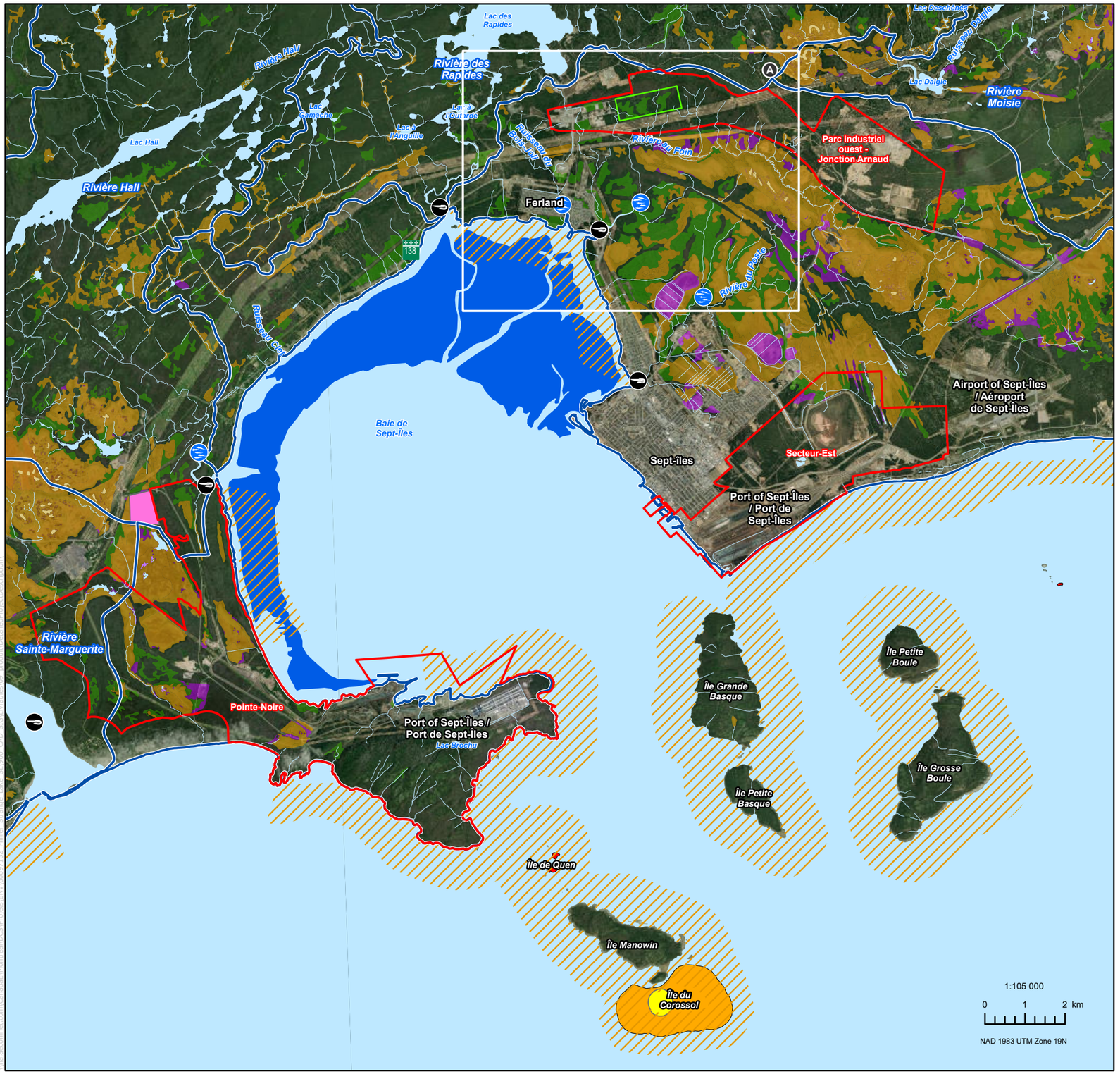
Map 14-1
Watersheds within the Project area in the North

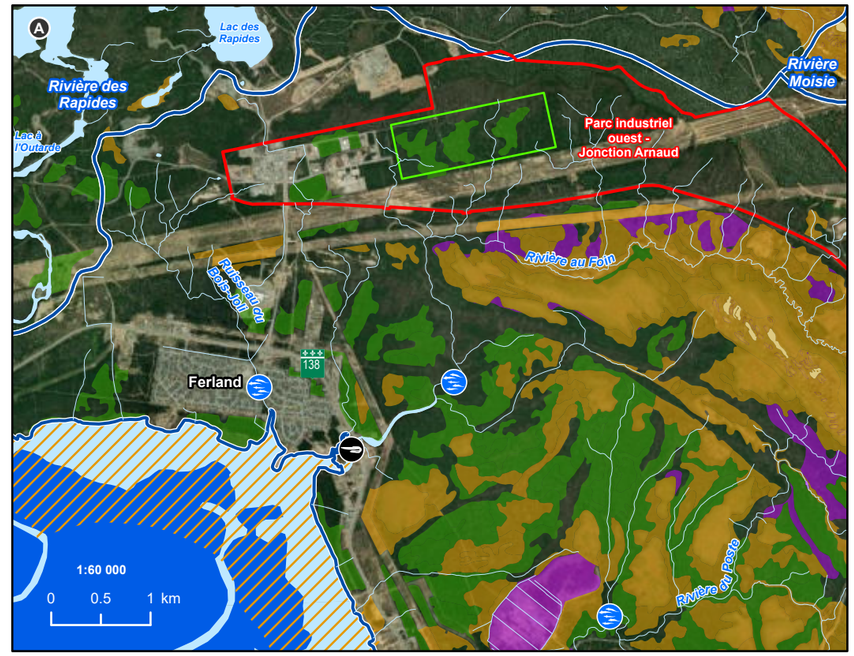
AECOM

\\na.aecomnet.com\Canada\EMontreal\DCS\Projets\ENV\60697132_Miner_Strange_Lake_SL0900_CAD_SIG\Livrables\09_produit\DetailedProjectDescription\

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT





Composante du projet / Project Component

- Site potentiel de l'usine de séparation des terres rares / Potential Site of the Rare Earth Separation Plant

Milieu humide / Wetland

- Marécage /Swamp
- Milieu humide / Wetland
- Tourbière / Bog

Aire protégée / Protected area

- Aire de concentration d'oiseaux aquatiques / Waterfowl concentration area
- Colonie d'oiseaux sur une île / Bird colony on an island
- Héronnière / Heronry
- Refuge d'oiseaux migrateurs / Migratory bird sanctuary
- Réserve naturelle reconnue / Recognized nature reserve

Milieu aquatique / Aquatic Environment

- Frayère d'éperlan arc-en-ciel / Rainbow smelt spawning ground
- Rivière occupée par l'anguille d'Amérique / River occupied by American eel
- Herbier de zostère / Eelgrass beds

Hydrographie / Hydrography

- Bassin versant / Watershed
- Cours d'eau / Watercourse

Autre / Other

- Zone industralio-portuaire de Sept-Îles / Sept-îles industrial port area

Source:
Aire protégée / Protected area: MELCCFP (2024)
Bassin versant / Watershed: MELCCFP (2023)
Données topographiques / Topographic Data: NRCan (2022)
Habitat du poisson / Fish habitat: CRECN (2016)
Herbier de zostère / Eelgrass beds: Carrière, J. ed. 2018. Observatoire environnemental de la Baie de Sept Îles
Hydrographie / Hydrography: MRNF (2023)
Milieu humide / Wetland: MELCCFP (2019)
Zone industralio-portuaire de Sept-Îles / Sept-îles industrial port area: Gouvernement du Québec (2018)

Carte 14-2
Milieu naturel de la baie de Sept-Îles

Map 14-2
Natural Environment of the Sept-Iles Bay

AECOM

- The bedrock below the upper level has a hydraulic conductivity value ranging from 1.2×10^{-8} m/s to 5.6×10^{-6} m/s. Based on these results, the bedrock is considered to have very low permeability. Since the bedrock fracture density is likely to decrease with depth, the bedrock aquifer has a limited yield.

The vertical hydraulic gradient appears to be upward, from bedrock to the surficial deposits. The upward vertical gradient is most pronounced in the slope area of the B-Zone ore body and the esker.

Groundwater characterization in 2011 involved groundwater sampling from 14 monitoring wells while the 2012 groundwater characterization has involved the sampling of 25 monitoring wells. The pH varied between 5.3 and 7.3. Electrical conductivities are low to very low, which can be expected in water with very low to low dissolved solids content. The total alkalinity varied from <1 to 89 mg/l, which is low to very low. The total hardness was in the range of 10 to 410 mg/l. Considering the conductivity, total alkalinity and total hardness, the groundwater would be classified as soft to very soft. The results also showed that:

- An undifferentiated till overburden, with poor aquifer potential, is present in the till and is the primary hydrogeological unit covering the Site.
- Certain metal concentrations (Al, Cu, Ag, Zn) exceeded the Quebec seepage to surface water criteria. This indicates that the natural groundwater is already exceeding the recommended Quebec limits for groundwater discharge to surface water.
- Radionuclides were detected in most samples. Total concentrations are up to 28 Bq/L in samples from fractured bedrock below the esker aquifer.
- Rare earth elements were detected in many samples. The highest concentrations of REEs were detected in the esker aquifer and bedrock beneath. This information tends to confirm that the B-Zone ore body influences the groundwater quality in the downgradient in terms of groundwater flow from the mineralized zone.

Studies to be undertaken:

An additional groundwater characterization will be carried out at the mine site to take account of the new footprint of mine facilities, which will be determined by the prefeasibility study, as well as to comply with the impact assessment guidelines and other requirements that were updated since 2011-2012. For example, groundwater in the broader study area (one-kilometer radius) should be covered by the study and additional parameters have to be analysed.

Consultations with federal, provincial (NL) and Nunatsiavut authorities will be conducted to determine the initial groundwater characterization needed along the future seasonal road and in the future container storage and handling facility at either Anaktalak Bay for Option A or Voisey's Bay for Option C1 and C2.

A three-dimensional numerical groundwater model will be developed to estimate mine inflows to the pit, to support the ESIA as well as water management planning. Data for this model and groundwater inflow estimates will be gathered during field investigations:

- Characterization of the bedrock aquifers with the help of a drilling program.
  - Geological logging of several diamond drill boreholes to target any specific features identified during geological mapping, historical borehole logging or structural geology interpretation.
  - Geomechanical core logging and/or downhole survey (ATV/OTV) to characterize structural features that could create preferential groundwater flow pathways between Lac Brisson and the open pit.
  - Packer testing to determine the hydraulic conductivity of the rock mass and specific structural features identified during drilling.
  - Instrumentation of select boreholes with vibrating wire piezometers to monitor groundwater elevations and gradients.

- Instrumentation of boreholes with thermistors to characterize the thickness and extent of the active layer, permafrost temperatures and the geothermal gradient surrounding the open pit. Permafrost could be an important control on groundwater inflows and influence the potential for ice formation in the pit high wall.
- Instrumentation of select boreholes with monitoring wells to facilitate groundwater sampling and characterize vertical and horizontal groundwater gradients.
- Groundwater quality sampling to determine baseline groundwater quality, including contaminants of potential concern in groundwater adjacent to the open pit. This information will be used to evaluate treatment needs.

- Evaluation of potential geologic structures to contribute additional groundwater to the open pit. A structural model describing local and regional patterns of fracturing and faulting would help understand the potential for groundwater flow along conductive structures connecting nearby surface water bodies (e.g. Lac Brisson) to the proposed open pit.
- Developing a thermal model to simulate the spatial distribution of permafrost in proximity to the open pit. The distribution and temperature of permafrost will be an important control on groundwater flows reporting to the open pit and requires detailed analysis. Furthermore, mining may induce degradation of permafrost and allow for increased hydraulic connection between Lac Brisson and the open pit.
- Evaluation of the potential for intersections between ungrouted boreholes and the proposed open pit following completion of the mine design. This would help evaluate the risk of uncontrolled inflows from Lac Brisson to the open pit, and establish if possible, a borehole grouting program to reduce the risk of unmanageable groundwater inflows and mine flooding.

14.1.6.2 Separation Plant (Sept-Îles project component)

No groundwater characterization is currently available on the separation plant surroundings in Sept-Îles. A groundwater characterization meeting the requirements of applicable guidelines will be conducted at the future separation plant site as part of the impact assessment study.

14.1.7 Hydrology and Water Management

14.1.7.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The Quebec-Labrador border is delineated following the drainage basins/ watersheds. The study area occupied by the mine site is bordered on its eastern limit by a continental watershed divide, on its northwest limit by Lake Brisson, and on its western limit by the Lake Brisson outlet, e.g. Lake Napeu Kainiut watershed. From the outlet of Lake Brisson, water flows into the Deat River and eventually the George River, after running through a string of lakes for a total of 103 km. The George River is a large river that flows northwards up to the Ungava Bay (Arctic). At the mine site, the hydrological network is comprised of 19 sub-watersheds, eight of which drains into Lake Brisson. These eight sub-watersheds cover a total area of 18 km^2 (27% of the project area), of which 4.5 km^2 drain directly into the Lake Brisson. The other 11 sub-watersheds flow either towards Labrador or Lake Napeu Kainiut, directly south of the mine site.

Thus, approximately 80% of the mine site (51.3 km^2) is located in the northeastern part of the Deat River watershed (Quebec) and the remaining part (12.1 km^2) drains into the Notakwanon watershed (Labrador). Taken together, these sub-watersheds create a multi-basin pattern due to numerous surface depressions. Indeed, more than 90 small lakes or depressions are found in the project study area. Two types of oligotrophic lakes are common in this region: small, shallow, irregular ponds which occupy hollows eroded in the bedrock; and larger rock-basin lakes created by damming that resulted from natural accumulations (AECOM, 2012b).

Along the access road in Labrador, three main watersheds are encountered, namely from west to east: the Kogaluk River, the Ikadlivik Brook, and the Reid Brook. Other watersheds are encountered (see Section 14.1.5.3), such as Konrad River and Toma Brook for Option C of the road access.

In the northern components of the project, water management, drainage and hydraulic modeling will be performed to account for standards to undertake regarding the construction of a new rare earth mine and a road access (modification of drainage, discharges, sanitary waters, etc.).

Studies to be carried out:

Mine site

In Quebec, the current standards that apply are mainly driven by the *Directive 019* for the mining industry (MDDEP, 2012), and its associated regulations such as the *Guide de caractérisation des résidus miniers et du minerai* (MELCC, 2020), *Radionucléides recommandés pour l'analyse de la radioactivité dans les matrices environnementales* (MDDELCC, 2017), as well as the Metal and Diamond Mining Effluent Regulations (SOR/2002-222) at the Federal level. Specifically, in the *Guide de caractérisation physicochimique de l'état initial du milieu aquatique avant l'implantation d'un projet industriel* (MDDELCC, 2017), and specifically under Appendix 3 *Annexe 3- Information à fournir- Modélisation hydrodynamique de l'effluent*, the characterization of the hydrology should include the low flows of the watercourse effluent receiver (Q2.7, Q10.7 and Q5.30). It must also assess the area of the watershed upstream from the discharge point of each effluent. A numerical modeling of the dilution and dispersion of the effluent (mining and waste) is necessary to establish the environmental discharge objectives (EDO) if the receiving environment of the effluent has complex hydrodynamics or if we consider that the mixture of the effluent will not be complete over the entire watercourse at a distance of 250 meters from the discharge point (MELCC, 2022).

Hydraulic engineering work will be driven by the guidelines for mining project in Quebec. These guidelines will guide the identification of variants of infrastructure footprint based on the natural drainage on site. Torngat Metals will propose project footprint variant fully aligned with integrating aspects of sustainable development and strategy, such as for discharge points (sanitary water, mining waters) or sedimentation ponds, etc. Those regulations will also inform the applicable design criteria for the water management infrastructures (Ponds, ditches, culverts) by updating the hydrological study previously conducted (2011-2012) with analysis of the various data sets, validation in the current context. New data acquisition (2023-2024) will aim at measuring flow and depth using ADCP (acoustic Doppler current profiler) equipment along with current standards in order to produce a detailed hydrological characterization of the study area. Those newly acquired data will also serve to feed the drainage network model of the site and the hydrodynamic model.

Moreover, in term of mine water balance, a monthly mine water balance with dry, average and wet climatic conditions will be developed on the most recent configuration projected for three typical years and integrating the climate change context. A model of the complete drainage network will be built. Hydrodynamic models for the characterization and delimitation of the plume dilution and dispersion of the mining effluent and adjacent area will also be developed. Data acquisition will be completed in order to conduct any additional studies potentially needed to improve the water management.

Hydrodynamic modelling to assess the dilution and dispersion of the mine effluent plume.

The hydrodynamic modeling aims to, firstly, delimitate the mining effluent plume in the receiving waters (Brisson Lake) and, secondly, evaluate the dilution rates at different distances to the effluent release point according to the provincial and federal environmental standards. Numerical modelling will also be performed to determine the dispersion under different environmental conditions (scenarios). The mine effluent modeling will comply with the applicable guidelines and standards, such as the *Directive 019* (MDDEP, 2012), on the guidelines on *Calculation and Interpretation of Environmental Discharge Objectives (EDO) for Aquatic Contaminants* MELCC (2022) and on the technical guide for conducting Metal Mining Effluent Plume Delineation Studies (Environment and Natural resources, 2003).

The Cormix/Plumes model and TELEMAC/Deflt3D model will be used for the effluent modeling, as they are the recognized tools for analyzing and predicting the dilution of effluent plumes and for designing diffusers. The obtained results will allow to optimize both the location and the configuration of the effluent discharge site. Data acquired in 2011-2012 and available climate data from ECCC will be profitable to carry out this activity. In addition, new efforts will be deployed in 2023-2024 into the data acquisition in order to refine and validate the hydrodynamic model.

Results from 2023 and 2024 workplan

In July 2023, bathymetric surveys have been conducted all over the Brisson Lake. Map 14-3 outlines the lake depths. Average depth is estimated at 5.23 m, ranging between 2 and 9 m with a maximal depth reaching 21.4 m in the eastern Baie. Visual Plume modelling of water dispersion undertaken by AECOM in fall 2023 confirms low water dispersion throughout the lake. This is explained by the bathymetric configuration of the lake characterized by a group of islands in the middle of it. These islands create a discontinuity in the lake surface, resulting in enclosed sections of the lake that decrease the fetch capacity of the wind. Moreover, the lake is frozen half of the year limiting the overall water circulation in summer.

To estimate contamination dilution within the Déat River watershed, a dilution factor analysis will be performed in 2024 initially by a desktop analysis and then by a fieldwork campaign in the summer 2024. The desktop analysis will delineate every lake sub-watershed, from Lake Brisson to the discharge of the Déat outflow in the George River. The desktop analysis will be performed by GIS on the publicly available digital elevation model (DEM) and the use of the provincial discharge and level monitoring station located at the outlet of the Indian House Lake.

To quantify the lowest dilution capacity of the Lake Brisson watershed, the fieldwork campaign will be conducted in summer when water level and river flow are at the lowest. This worst-case scenario must be evaluated since water contamination would be more critical at that period. In high flow conditions (snow melt or high precipitation), an increase in water discharge will dilute any potential contamination, decreasing concentration downstream. The work will consist of gauging water flow and taking water samples at each lake discharges between Lake Brisson and Indian House Lake at close temporal intervals to compare similar flow conditions and water parameters between sites. The list of the lakes and rivers targeted, sorted from upstream to downstream, with their discharge coordinates, is described in Table 14-13.

Table 14-13: Discharge coordinates of water bodies targeted by the dilution factor analysis

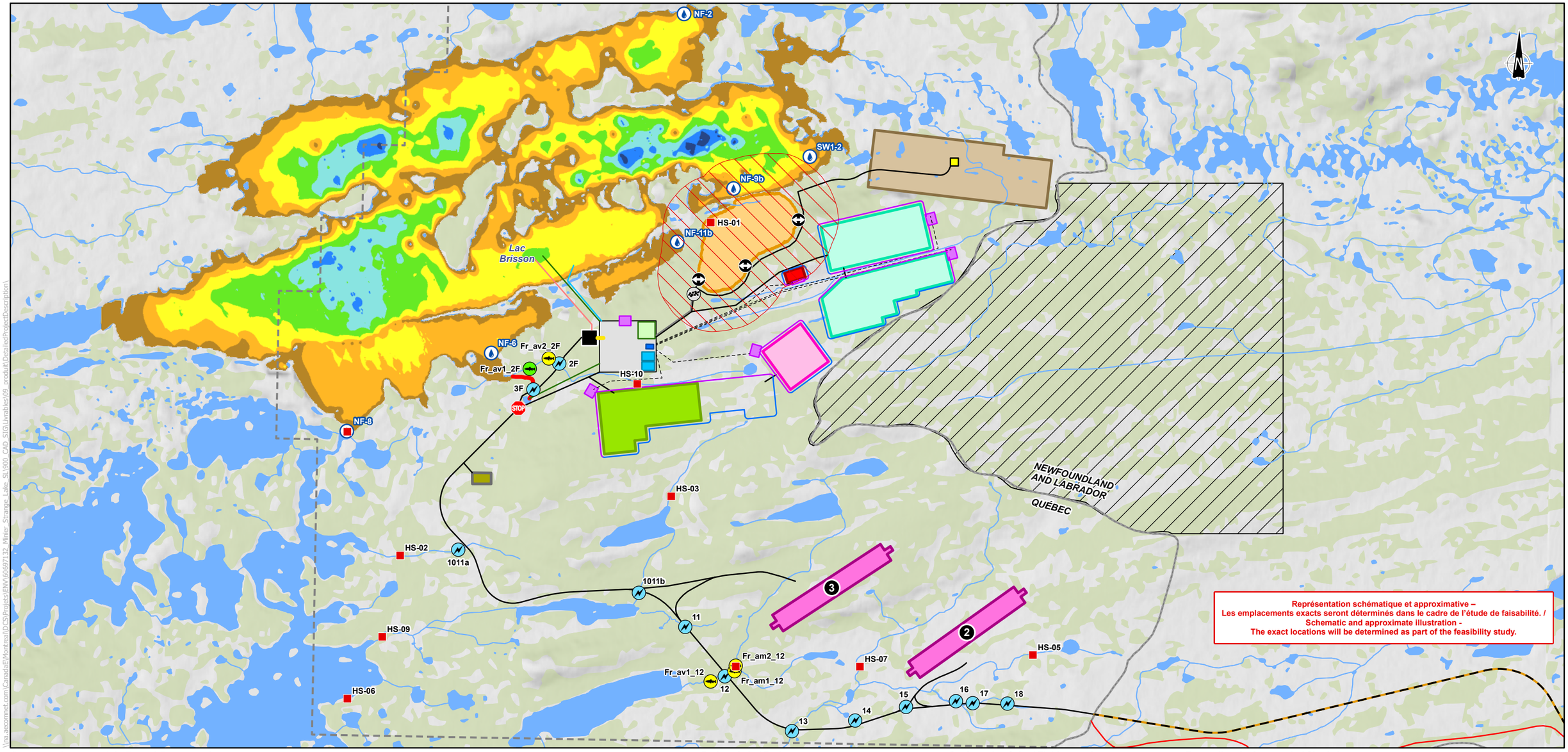
Discharge Order	Water Body	Latitude	Longitude
1	Lake Brisson	56.298456°N	64.246192°W
2	Lake Napeu Kainiut	56.150503°N	64.210701°W
3	Lake Cananée	56.029222°N	64.211274°W
4	Lake Bjarni	55.894823°N	64.235778°W
5	Lake Mistinibi	55.993322°N	64.300347°W
6	Lake Kashetsheministukut	56.029733°N	64.510820°W
7	Lake Ntshuku Ministuku	56.038120°N	64.583010°W
8	Déat River	56.078544°N	64.718260°W
9	Indian House Lake (George River)	56.233270°N	64.727639°W

Road corridor to port facilities

The road corridor is located between the Strange Lake B-Zone Deposit in Quebec and Anaktalak Bay on the coast of Labrador for the Option A of the road access, or Voisey's Bay for the Option C of the road access. Depending on the alignment, the total length of the road alternatives may vary between 166 km to 189 km. The main rivers flowing easterly in Labrador are the Kogaluk River, Konrad Brook, Kogluktokoluk Brook, Ikadlivik Brook, Reid Brook and Little Reid Brook. Ikadlivik Brook is a tributary of Kogluktokoluk Brook, which empties into the head of Voisey's Bay. Reid Brook's mouth empties at the same location as the Kogluktokoluk River and is normally considered as an extended tributary of the Kogluktokoluk–Ikadlivik River system. Reid Brook flows into Voisey's Bay while Little Reid Brook flows into Anaktalak Bay.

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composantes du projet / Project Components

- Porte d'accès / Access gate
- Sortie de la fosse / Pit exit
- Station de concassage / Crushing Station
- Canalisation souterraine / Underground pipeline
- Convoyeur / Conveyor
- Point de rejet alternatif des eaux usées minières traitées / Alternative discharge point for treated contact and process wastewater
- Fossé d'eaux usées minières / Contact water ditch
- Fossé d'eaux de ruissellement du bassin versant / Non-contact water ditch
- Prise d'eau / Water intake piping
- Routes de service et de halage / Service and hauling roads)
- Tunnel d'accès / Access tunnel
- Émissaire des eaux usées minières traitées / Treated contact and process wastewater outlet
- Émissaire des eaux usées domestiques traitées / Treated domestic wastewater outlet
- Zone de souffle d'explosion / Blast zone
- Aire d'accumulation des résidus miniers / Mine residue stockpile area
- Aire d'entreposage de mort-terrain / Overburden stockpile
- Banc d'emprunt / Borrow pit
- Bassin de collecte d'eaux usées minières / Contact water collection pond
- Camp permanent des travailleurs / Permanent worker camp
- Halde de stérile / Waste rock
- Fabrication et stockage d'explosif / Explosive manufacturing and storage facilities
- Fosse minière / Mine pit
- Ressource à basse teneur / Low-grade stockpile
- Stockage de carburant / Fuel tank farm
- Site d'enfouissement / Landfill site
- Zone industrielle / Industrial area
- Usine de traitement des eaux / Effluent treatment plant
- Bassins d'entreposage des eaux / Water storage ponds
- Potential airstrip

Bathymétrie / Bathymetry

Profondeur / Depth

- -21.4 à/to -18 m
- -18 à/to -15 m
- -15 à/to -12 m
- -12 à/to -9 m
- - 9 à/to -6m
- -6 à/to -3 m
- -3 à/to 0 m

Stations de pêche / Fishing stations

- Station de pêche électrique / Electric fishing station

Investigation fraie automnale / Fall spawning investigation

- Frayère confirmée d'omble de fontaine / Confirmed brook trout spawning ground
- Frayère potentielle d'omble de fontaine / Potential brook trout spawning ground

Qualité de l'eau / Water quality

- Station de la qualité de l'eau de surface / Surface water quality station

Station de mesure / Measuring station

- Station de mesure / Measuring station

Route d'accès à une voie / Single Lane Access Road

- Option A
- Option C2
- Option C1

Autre / Other

- Limite de propriété / Property limit
- Frontière Québec et Labrador / Quebec and Labrador border
- Terres des Inuit du Labrador / Labrador Inuit Lands (LIL)

1:48 000

0 500 1 000 m

NAD 1983 UTM Zone 20N

Carte 14-3
Stations inventoriées en 2023 au site de la mine

Map 14-3
2023 Sampling Stations and Surveys at the Mine Site

AECOM

\\vs.aecomnet.com\Canada\Montreal\DCS\Projects\BNV\60697132_Mineir_Strange_Lake_SL1900_CAD_SIG\Livrables\09_produits\Details\ProjectDescription\

Specific hydraulic studies will be performed in 2024 along the main water crossings of the access road to verify the conformity of type of crossing (bridge, arch culvert, and culverts) according to the provincial and federal standards, while ensuring proper fish passage in all water level conditions. At the main water crossings, more comprehensive data will be gathered in order to complete a 1D / 2D hydraulic modeling in order to study the river behavior and to conduct the design of the main water crossings. The following measures will be taken:

- Water level seasonal monitoring.
- Discharge measurements in high flow and low flow conditions.
- Bathymetric and topographic cross section upstream and downstream of crossings.
- Drone Lidar surveys.

Water pressure sensors will be installed to monitor seasonal water level fluctuation at each crossing. They will be retrieved later in the fall. Since the water pressure sensor measures both water and air pressure, a barometric sensor (air pressure) will also be installed to correct for air pressure and precisely determine water level changes. Solinst's Levelogger 5 and Barologger 5 will be water pressure and barometric sensors, respectively. Logger's XYZ coordinate will be taken with a Trimble R12i GNSS receptor connected in real-time on a RTK base station manually implemented nearby.

Water discharge gauging will be performed to evaluate the quantity of water flowing at each crossing. Water discharge measurement will be carried out slightly upstream or downstream of the sites identified, based on the cross-sections best suited and safe to the measurements (i.e. free of obstacles, limited turbulence, uniform current, and away from cascade and riffles). Water discharge data will be collected with the M9 Acoustic Doppler Current Profiler (ADCP) from Sontek company mounted on a boat or fixed on a floating platform attached to a rope. The ADCP will provide a detailed vertical and horizontal scan of velocities throughout the measured water cross-section. Note that no discharge measurements will be conducted downstream of #WC 116 (Bridge #1) since the river breaks in steep cascades at this location.

Bathymetric and topographic measurements will be completed to determine river crossing morphology. Note that this task will likely be conducted in spring and summer. In spring, the water level is higher, allowing easier boat access to the river reaches. Still, in summer, a lower water level gives access to specific locations on foot otherwise inaccessible by boat because of high water velocity and turbulence. Bathymetric and topographic data will be carried out by cross-sections every 10 m within the first 100 m upstream and downstream of the crossing location, then every 25 m until the 250 m range is reached. Note that no bathymetric measurements will be conducted downstream of #WC 116 since the river breaks in steep cascades at this location.

High-accuracy GNSS positioning of bathymetric soundings and topographic elevations will be collected in real-time using a Trimble GNSS R12i receptor connected to a nearby manually implemented RTK base station. Bathymetric data will be collected with the five-beam ADCP Sontek M9 echosounder mounted on a boat. Topographic elevations will be collected with the GNSS receptor directly installed on a graduated pole. Coordinate will be projected in the NAD1983 UTM 20N and elevation (Z) data will be collected in the CGVD28 altimetric reference system corrected with the HTv2.0 (epoch 1997.0) geoid model.

14.1.7.2 Separation Plant (Sept-Îles project component)

The separation plant in Sept-Îles will be located in an area designated for industrial usage. A hydrological analysis will be conducted to the site in order to characterize the hydrological portrait of the study area as well as the delimitation of the watersheds and the drainage network. At the project current stage of development, it is not anticipated to have a routine discharge point. A discharge point will be established only for the purpose of emergency discharges during large storm events. The water balance model will inform of the maximum retaining capacity of the site. It is important to note that all the water balance model will include a climate change impact component. At this point, the emergency discharge point for the water treatment plant of the separation plant is not known. A mining effluent plume modeling will be conducted in the receiving waters should an effluent discharged from the plant into the Bay of Sept-Îles, in order to assess the dilution rates accordingly to the provincial and federal environmental standards.

14.1.8 Limnology (freshwaters)

14.1.8.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

Limnology within the region of the mine site and for both options along the road corridor in Labrador and LIL is typically characterized by oligotrophic conditions, which refers to waters with low nutrient input and low biological productivity. Waters are characterized with low buffering capacity.

This is the case for the two main lakes at the mine site, Lake Brisson and Lake Napeu Kainiut. Despite being fed by several small lakes, ponds, and streams, some of which are intermittent, these oligotrophic conditions have been documented through various laboratory analyses of water samples in 2011-2012, and in 2023, as well as *in situ* measurements of certain surface water quality parameters. Similar results occurred while sampling at the three main water crossings along the Option A road corridor in 2012.

Studies of baseline conditions in the field will continue in 2024, particularly regarding Option C of the road. As presented in Section 14.1.5.3, freshwater watersheds that are expected to be crossed by the access road include the Kogaluk River, the Konrad Brook, the Ikadlivik Brook, the Toma Brook, the Reid Brook and Little Reid Brook in Labrador and LIL (Options A and C).

14.1.8.2 Separation Plant (Sept-Îles project component)

The separation plant in Sept-Îles includes overlapping to the drainage of the Au Foin River, which is a tributary of the Bay of Sept-Îles (Map 14-2). The bay is recognized as a high ecological value ecosystem, where tributaries such as the Au Foin River provide freshwaters with varying feeding resources and minerals. The presence of filamentous algae is reported along with the rainbow trout egg retention for the Au Foin River, of a total watershed of 562 m², which is a sign of eutrophication within the watershed (OBV Duplessis, 2021).

14.1.9 Surface Water Quality

14.1.9.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

Previous Studies (2011-2012)

Surface water quality was monitored in 2011 and 2012 at a total of 23 sampling stations located throughout the mine site to account for the spatial variability of different water bodies in the study area. The laboratory was asked to set detection limits (RDL) below the criteria in order to guarantee results comparable to the guidelines. Parameters included metals and metalloids, rare earth elements (REE) and associated minerals, radioisotopes, nutrients, trophic status indicators, and hydrocarbons. To account for temporal trends, water quality data was acquired for four seasons, including winter, and showed relatively low concentrations of metals, radioisotopes, nutrients, and other elements across the study area. Table 14-14 details the list of analytes considered in 2011-2012 (AECOM, 2013c).

Table 14-14: Surface water parameters analysed in 2011-2012 at the Mine Site (AECOM, 2013c)

Ions, total metals and metalloids		Nutrients and others	Rare Earth Elements	Radioactives isotopes	Hydrocarbons and PAHs	BTEX	Phenols
Aluminium	Mercury	Ammonia	Cerium	Lead-210	Hydrocarbons C_{10}-C_{50}	Benzene	o-Cresol
Antimoiny	Molybdenum	Acidity	Dysprosium	Radium-226	Acenaphtene	Chlorobenzene	p-Cresol
Silver metal	Nickel	Alcalinity	Erbium	Radium-228	Acenaphtylene	Dichloro-1,2 benzene	Dimethyl-2,4 phenol
Arsenic	Niobium	Bicarbonates	Europium	Thorium-228	Anthracene	Dichloro-1,3 benzene	Nitro-4 phenol
Barium	Gold	Chloride	Gadolinium	Thorium-230	Benzo(a)anthracene	Dichloro-1,4 benzene	Phenols totaux
Beryllium	Palladium	Chlorophyll a	Holmium	Thorium-232	Benzo(a)pyrene	Ethylbenzene	Chloro-2 phenol
Bismuth	Lead	Conductivity *in situ*	Lanthanum	Uranium-234	Benzo(e)pyrene	Styrene	Chloro-3 phenol
Boron	Potassium	Conductivity *labo*	Luteum	Uranium-235	Benzo(b+j+k)fluoranthene	Toluene	Chloro-4 phenol
Bromine	Rhénium	Dissolved organic carbon	Neodymium	Uranium-238	Benzo(c)phenanthrene	Xylenes	Dichloro-2,3 phenol
Cadmium	Rubidium	Dissolved Oxygen *in situ*	Praseodymium		Benzo(g.h.i)perylene		Dichloro-2,4 + 2,5 phenol
Calcium	Selenium	Fluorides	Samarium		Chrysene		Dichloro-2,6 phenol
Chromium	Silicium	Hardness	Scandium		Dibenzo(a.h)anthracene		Dichloro-3,5 phenol
Cobalt	Sodium	Nitrates	Terbium		Dibenzo(a.i)pyrene		Pentachlorophenol
Copper	Strontium	Nitrites	Thulium		Dibenzo(a.h)pyrene		Tetrachloro-2,3,4,6 phenol
Total cyanides	Tantalum	pH *in situ*	Ytterbium		Dibenzo(a.l)pyrene		Tetrachloro-2,3,5,6 phenol
Tin	Thallium	pH labo	Yttrium		Dimethyl-7.12 benzo(a)anthracene		Trichloro-2,4,5 phenol
Iron	Thorium	Redox potential			Fluoranthene		Trichloro-2,4,6 phenol
Gallium	Thungsten	Sulfate			Fluorene		Chlorophenols
Germanium	Titanium	Sulphides			Indeno(1.2.3-cd)pyrene		
Hafnium	Uranium	Temperature *in situ*			Methyl-3 cholanthrene		
Indium	Vanadium	Total Nitrogen Kjeldahl			Naphtalene		
Lithium	Zinc	Total phosphorus			Phenanthrene		
Magnesium	Zirconium	Total suspended solids			Pyrene		
Manganese		Turbidity in situ			Methyl-1 naphtalene		
		Turbidity labo			Methyl-2 naphtalene		
					Dimethyl-1.3 naphtalene		
					Trimethyl-2.3.5 naphtalene		

The 2011-2012 datasets are considered historical reference baseline data, in which water quality values exceeding guideline concentrations will be highlighted but will not be considered representative of exposure conditions. Any indications of toxicity should be considered to be attributable to natural prevailing conditions within the study area. There are, however, no criteria for some metals[17], rare earth elements (REE[18]), radioactive isotopes, sulphides (H_2S), tellurium (Te), thorium (Th), potassium (K), sodium (Na), total Kjeldahl nitrogen (TKN), C_{10}-C_{50}, sulfates (SO_4), bicarbonates (HCO_3), acidity, alkalinity, hardness, conductivity, redox potential, and temperature.

The results indicate some seasonal and interannual variability for key parameters such as pH. Along the road corridor (Option A), surface water quality was addressed while sampling at the three main water crossings previously mentioned. Aluminium (Al) and iron (Fe) were the metals most frequently exceeding provincial and federal guidelines (MDDEP, CCME, 2012). More precisely, for the mine site, the 2011-2012 results are as follows:

- Physico-chemistry: low alkalinity values, which when considered in addition to low conductivity, low calcium and low sulfate values all suggest slightly acid water bodies with low buffer capacity to resist to pH variations. For the ecosystem trophic status, measurements indicated a relatively low concentration of nutrients with low organic production (low total phosphorus, chlorophyll *a*, nitrates, nitrites, nitrogen, ammonia and dissolved organic carbon), high dissolved oxygen concentrations, low turbidity, and low total dissolved solids.
- Metals: most trace metals within the study area had naturally low concentrations. The following metals were not detected for all stations: antimony (Sb), barium (Ba), bismuth (Bi), cadmium (Cd), cesium (Cs), chromium (Cr), cobalt (Co), gallium (Ga), germanium (Ge), gold (Au), hafnium (Hf), indium (In), lithium (Li), mercury (Hg), palladium (Pd), rhenium (Re), rubidium (Ru), selenium (Se), silver (Ag), tantalum (Ta), thallium (Tl), tin (Sn), titanium (Ti), tungsten (W), uranium (U), and vanadium (V). Trace metals that were frequently occurring at levels exceeding either provincial and/or CCME guidelines were the aluminum (Al) and iron (Fe). Other exceedances of guidelines concerned: beryllium (Be), copper (Cu), lead (Pb), and zinc (Zn).
- Rare earth elements (REEs) and associated minerals (Be, Nb, U, Th, Zr): all stations had concentrations below the RDL for the various REEs, which varied from 0.010 mg/L to 0.500 mg/L depending on the element, except for one measurable value of yttrium (Y) (0.0071 mg/L). In terms of associated minerals, niobium (Nb), thorium (Th), zirconium (Zr), and uranium (U) were not detected at their reported detection limits (RDLs), which were 0.050 mg/L, 0.100 mg/L, and 0.500 mg/L, and 0.01 mg/L respectively. Only beryllium (Be) was reported at detectable concentrations in surface waters.
- Radioisotopes were investigated in streams and in lacustrine stations of Lake Brisson. The station closest to the deposit had a measurable value (>0.01 Bq/L) for both radioisotopes (Ra-226: 0.03 Bq/L, Th-228: 0.04 Bq/L) in surface waters in 2011. I In 2012, Th-228 (0.02 to 0.05 Bq/L) and U-234 (0.02 Bq/L) were detected in surface waters at each station. Th-230 (0.02 to 0.05 Bq/L) and Ra-226 (0.017 to 0.044 Bq/L) were detected at two stations.
- Polycyclic aromatic hydrocarbon (PAH), MAH/BTEX, phenols and hydrocarbons C10-C50 were not detected at their reported detection limits (RDLs), which were 0.0001 mg/L, 0.0003-0.001 mg/L, 0.001 mg/L, and 0.10 mg/L, respectively. Nonmetals such as tellurium (Te), total cyanides, fluorides, and boron (B) were not detected at their reported detection limits (RDLs), which were 0.010 mg/L for Te, 0.003 mg Cn/L for cyanides, 1 mg/L for fluorides, and 0.060 mg/L for B.

Along the road corridor, results are based on three samplings completed in 2012 to account for seasonality. Low concentration of nutrients (nitrates, nitrites, total Kjedahl nitrogen, total phosphorus) with low organic production as they were either slightly above detection for dissolved organic carbon or were not detected at their reported detection limits (RDL). These indicators of low nutrient inputs when considered in addition to low alkalinity, low mineral content (conductivity), low hardness reflecting low concentrations of calcium (Ca) and magnesium (Mg), high dissolved oxygen concentrations, low turbidity, and low total dissolved solids all indicate oligotrophic conditions.

[17] Bismuth (Bi), cesium (Cs), gallium (Ga), germanium (Ge), gold (Au), hafnium (Hf), indium (In), niobium (Nb), rhenium (Re), rubidium (Rb), scandium (Sc), strontium (Sr), tantalum (Ta), tin (Sn), titanium (Ti), tungsten (W), zirconium (Zr)

[18] Rare earth elements= cerium (Ce), dysprosium (Dy), erbium (Er), lanthanum (La), neodymium (Nd), niobium (Nb), praseodymium (Pr), samarium (Sm), yttrium (Y), zirconium (Zr), Europium (Eu), gadolinium (Gd), Holmium (Ho), lutetium (Lu), Terbium (Tb), thulium (Tm), Ytterbium (Tb)

In terms of trace metals in surface water, none was reported in exceedance of the guidelines at any of the three main water crossings. For water crossings where large culverts were planned, turbidity was measured as it is a valuable indicator of suspended particulates in water, and this is particularly useful in the context of erosion of stream banks and evaluation of sedimentation of spawning grounds. As for the three main water crossings, the *in situ* measurements revealed low conductivity and turbidity values, a pH close to neutral (pH=7), and high dissolved oxygen concentrations. Total suspended solids (TSS) concentrations were all lower than the reported detection limit (<2 mg/L).

No data was acquired to date at water crossings in the Vale port facilities surroundings, and data from 1997 Voisey's Bay EIS is not considered as current reference.

Studies carried out (2023) and to be carried out (2024)

The *Guide de caractérisation physicochimique de l'état initial du milieu aquatique avant l'implantation d'un projet industriel* [Physicochemical characterization guide for the initial state of the aquatic environment before the implementation of an industrial project] (MDDELCC, 2017), was consulted. This guide provides details on the frequency and periods of water sampling to establish the reference state. The guide suggests that the sampling should be carried out monthly for a minimum of one year (or two years if technical problems occur during the ice period).

Since 2012, there are about 15 parameters whose water quality criteria for aquatic protection life have changed at federal and provincial levels. Torngat Metals plans to sample at the mine site area three times per year in 2023 and 2024. The data collected in 2011 and 2012 will be considered historical data and will be analysed to establish if a temporal trend (potentially linked to climate change) is noted between 2012 and now. The usage of field blanks and the taking of duplicates will be applied in this new sampling campaign, according to the terms of the guide.

The parameters to be analysed will follow those listed in the guide: total dissolved solids (TDS), total metals in trace and faecal coliforms. As the ice-free period is very short, however, it will not be possible to achieve a minimum of six samples (1 per month; temporal variability) in 2023. Nevertheless, Torngat Metals investigated the Lake Brisson ice thickness on March 26th, 2024, with sampling realised at five locations along the south-east shore. Mean ice thickness was 1.11 m with a maximum of 1.20 m and a minimum of 1.05 m. The quality criteria used to identify the thresholds that can induce a chronic effect on aquatic life are those of the MELCCFP (2023) and the CCME (2023). Finally, any methodology set out in the Guide (MDDELCC, 2017) will be applied. From the total stations sampled in 2011-2012, a subselection was made in 2023 depending on the variant of discharges. Subsampling will include one reference station that should not be affected by the mining activities, the outlet of Lake Brisson into Lake Napeu Kainiut, and four stations closer to the shore and mining infrastructures/activities.

Given the human health and ecological risk assessment (HHERA), surface water sampling will be added in 2024 at major water crossings along the access road and in the vicinity of the port facilities. Selection of sites will include sensitive habitats that could be identified by the communities. Analytical parameters will include conventional parameters, REE, conventional metals, and other parameters such as petroleum hydrocarbons (C_{10}-C_{50}).

For the Option C of the single lane access road, water sampling in the marine bay (Voisey's Bay) will be performed as well. See Section 14.3 for more details on the workplan.

Preliminary results from 2023 sampling

Surface water quality sampling was carried out in 2023 during the months of July, August, and October, specifically on July 19-20, August 22-23 and October 3-4. This three-month approach is designed to take into account the variability of water quality across seasons. All results are presented at Appendix F.

To analyze the results, the values obtained for the various parameters are compared with the MELCCFP criteria for the protection of aquatic life (chronic effects) and the CCME Water quality Guidelines for the protection of Aquatic Life (Long term exposure). Certain criteria are calculated as a function of hardness, dissolved organic carbon (DOC), pH or TSS where applicable.

A total of six stations were sampled in 2023: NF-2, NF-6, NF-8, NF9B, NF-11 and SW-1.2. Station NF-2 is considered the reference station because of its distance from the potential mine site, as shown on Map 14-3. From 2011-2012 sampling (six stations: NF-1, NF-2, NF-6, SW-1, SW-3 and EF-7), stations NF-2 and NF-6 were kept for current 2023-2024 sampling.

The results of the 2023 sampling campaign show that the water is well oxygenated (> 9 mg/L) and that pH is circumneutral, apart from a few instances where it is slightly acidic (below 6.5):

- For NF6 and NF8, pH < 6.5 in July (respectively 6.49 and 6.44)
- pH < 6.5 at all sites in October (6.38 – 6.48)

Given the remote northern nature of the study site, very few potential contaminants were measured at concentrations above the detection limits of the analytical equipment.

Among the parameters detected (> RDL), some are measured at concentrations exceeding the federal or provincial criteria/recommendations. This implies that the environment has natural levels for these specific elements. This was notably the case for:

- Aluminum and fluorides, which exceeded the CCME guideline on a few occasions (NF-6 in July and NF-2 in October)
- Lead exceeding the chronic endpoint (MELCCFP) for one sample (NF-6) in August
- Beryllium that exceeds the chronic endpoint (MELCCFP) for all samples

For the REE, it should be noted that RDLs were much lower in 2023 than in 2011/12, as such there are much more instances where REEs were detected:

- Europium and scandium were never detected (RDL = 0.003 µg/L)
- Terbium was detected sporadically in all three seasons (RDL = 0.002 µg/L)
- For other REEs, RDLs were exceeded on every date and at virtually all sites.

REE compounds were therefore naturally found in water during the 2023 sampling campaign, except for europium and scandium, and more rarely for terbium.

There are no instances of detected values for radioactive isotopes, hydrocarbons, phenols and volatile organic compounds.

Radionuclides:

- Thorium was detected (0. 004 µg/L to 0. 009 µg/L) at all times
- Uranium detected (0. 047 µg/L to 0. 067 µg/L) at all sites sampled on all 3 dates. The CCME guideline is 15 µg/L.

It appears that the six sites sampled show similar characteristics in terms of metals and nutrients. However, a difference is observed with regards to pH, with sites NF-6 and NF-8 showing a lower pH than the other sites.

Comparison of 2011-2012 to 2023

Overall, water quality during historical 2011-2012 to 2023 sampling campaigns was similar. The environment is characterized by an oligotrophic system with low hardness and circumneutral pH, typical of aquatic environments in the north. Legacy contaminants (Hg and PAHs) were below detection limits for both campaigns. REEs were detected during both campaigns, indicating that they are naturally occurring elements in this region, as were beryllium (Be), thorium (Th) and uranium (U). These comparisons must take into account that detection limits have improved significantly between the two campaigns, but they do indicate that values collected in 2011/2 remain indicative of current conditions at the site.

14.1.9.2 Separation Plant (Sept-Îles project component)

Reference water quality data was gathered in 2019 by the OBV Duplessis (2021), through 6 samplings that occurred from June to November 2019 on Au Foin River, such as the other tributaries of the Bay of Sept-Îles. Parameters analyzed were the ones considered in the *indice de qualité bactériologique et physicochimique (IQBP$_6$)*, namely: total phosphorus, fecal coliforms, suspended solids, ammoniacal nitrogen, nitrites-nitrates, and chlorophyll *a.* All parameters scored for good surface water quality in the Au Foin River (OBV Duplessis, 2021).

Studies to be carried out (2024):

A full characterization will be undertaken on the future separation plant site to comply with the *Guide de caractérisation physicochimique de l'état initial du milieu aquatique avant l'implantation d'un projet industriel* [physicochemical characterization guide for the initial state of the aquatic environment before the implementation of an industrial project] (MDDELCC, 2017). Sampling will begin in 2024.

14.1.10 Soil Quality

14.1.10.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

Soil quality was evaluated based on the results of analyses carried out in 2011 and 2012 on 33 soil samples collected at a depth range of 0.3 to 0.5 m and distributed across the proposed mine, stockpile areas and separation plant areas and excluded the road. The sampling was done in accordance with the guidelines and best practices applicable at that time. The results are as follows:

- The soil quality analysis results show uniform conditions across the entire site, including concentrations of rare earth elements (REEs).
- Metal concentrations comply with the "A" criterion of the MDDELCC (Churchill-Rae).
- Low concentrations of radioisotopes Ra-226, Th-228, Th-230, Th-232, U-234, and U-238 were measured at some stations.

Total hydrocarbon concentrations, VOCs, and PAHs were all below their respective MDDELCC standards or detection thresholds for these parameters.

Studies to be carried out (2024-2025):

An additional soil characterization will need to be carried out at the mine site to take account of the new footprint of mine facilities, which will be determined by the prefeasibility study, as well as to comply with the Quebec's guidelines that were issued in 2016 regarding the *Physicochemical characterization of the initial state of the soil before the implementation of an industrial project* (MDDELCC, 2016). As per these guidelines, soils in the broader study area (one-kilometer radius) should be covered by the study, and additional parameters have to be analysed to obtain better representative statistical set of data.

Consultations with federal, provincial (NL) and Nunatsiavut authorities will be conducted to determine the initial soil characterization needed along the future seasonal road (Option A and C) and in the future container storage and handling facility at Edwards Cove (Option A) or at Voisey's Bay (Option C).

14.1.10.2 Separation Plant (Sept-Îles project component)

No physicochemical data is currently available on the separation plant surroundings in Sept-Îles. A soil characterization meeting the requirements of Quebec's guidelines on the *Physicochemical characterization of the initial state of the soil before the implementation of an industrial project* (MDDELCC, 2016) will be conducted at the future separation plant site.

14.1.11 Sediment Quality

14.1.11.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

At the mine site, the sediments were sampled in 2011 and 2012 at seven lacustrine stations in Lake Brisson and five stream stations.

Arsenic, cadmium, and zinc exceeded the threshold effect level (TEL) in sediment according to Environment Canada and the MDDEP (2007) at four out of seven lacustrine stations within Lake Brisson, and in one out of five streams stations.

Sediment quality analysis was performed at the three main water crossings along the road corridor (Option A). No parameter was found in excess of a threshold limit. As for PAHs and PH C_{10}-C_{50}, their concentrations were below the reported detection limit (RDL). However, the reported limit of detection (RDL) for Chromium (Cr) and Copper (Cu) are between the TEL and OEL criterion (Environment Canada and MDDEP, 2007), e.g. 45 mg/kg and 40 mg/kg respectively. The results obtained for metals, rare earth elements, and radioisotopes are considered to be representative of the natural and ambient levels specific to the study area based on local mineralogical conditions. Laboratory analysis results for nutrient indicators confirm the presence of oligotrophic environmental conditions. As for PAHs and PH C_{10}-C_{50}, their concentrations were below the limit of detection (LOD).

No data was acquired to date at water crossings in the Vale port facilities surroundings, and data from 1997 Voisey's Bay EIS is not considered as current reference.

Studies to be carried out (2024-2025):

Sediment quality criteria have not changed since 2007, so the interpretation of the results from the previous baseline study should be valid. The quality criteria used in 2011 and 2012 to identify the thresholds that can induce an effect on the aquatic life are still applicable and will be used (Environment Canada and MDDEP, 2007).

At the mine site, sediment quality sampling will be updated in 2024. For sediment quality, the sampling frequency required in the new Guide (MDDELCC, 2017) is limited to one sampling. However, as with the surface water quality, more parameters will be added to comply with the Guide: total organic carbon, sulfur, humidity percentage, some metals, rare earth elements and radio-elements. As for surface water quality, sediment sampling stations will be planned in a representative reference area, at the Lake Brisson outlet and at four stations in the vicinity of mining infrastructures and activities. Granulometry of surface sediment will also be completed in 2024 under laboratory analysis. Sampling or an analysis of the vertical state (by corer) of the sediments is not planned as this practice is only useful if the study site has a history of anthropogenic discharge (MDDELCC, 2017).

As for surface water quality, given the human health and ecological risk assessment (HHERA), sediment sampling will be added in 2024 at major water crossings along the access road and in the vicinity of the port facilities. Selection of sites will include sensitive habitats that could be identified by the communities. Analytical parameters will include conventional parameters, REE, conventional metals, and other parameters such as petroleum hydrocarbons (C_{10}-C_{50}).

For the Option C of the single lane access road, sediment sampling in the marine bay (Voisey's Bay) will be performed as well. See Section 14.3 for more details on the workplan.

14.1.11.2 Separation Plant (Sept-Îles project component)

No reference sediment quality data is currently available for the Au Foin River in the separation plant surroundings in Sept-Îles,

A full sediment characterization will be undertaken in Sept-Îles for the separation plant in 2024, as specified in the *Guide de caractérisation physicochimique de l'état initial du milieu aquatique avant l'implantation d'un projet industriel* [physicochemical characterization guide for the initial state of the aquatic environment before the implementation of an industrial project] (MDDELCC, 2017).

14.2 Biological Environment

As already mentioned, the information presented in the following sections is based on data already obtained in the past, mainly in 2011 and 2012, although new data acquisition has started in 2023. This baseline data will be updated as part of the impact environmental assessment study.

14.2.1 Vegetation and Wetlands

14.2.1.1 Strange Lake Mine Site, Container Storage and Handling Facilities (northern project component)

The mine site area is characterized by arctic vegetation dominated by wetlands. During the floristic surveys conducted in 2011 and 2012, wetlands covered 45% of the study area. Also, during these surveys, low habitat diversity was observed. Tall shrubs (dwarf birch and bog bilberry) and trees (white spruce) were restricted to the transitional slopes between the central plateau and Lac Brisson, as well as along streams and the edges of some lakes (larch). Greater plant diversity was found in riparian areas and near the shores of Lac Brisson. The most diverse environments were fens and marshes with calciphilous flora. Snowbeds were also unique microhabitats for the flora. At the mine site, a total of 88 plots were fully sampled and an additional 43 observation points were characterized for mapping purposes. A total of 115 vascular plant species were found at the mine site area of about 80 km^2 (lakes included). Twenty vegetation subclasses were defined on a structural basis for mapping purposes. The classification is hierarchical, allowing the generalization of vegetation cover into nine overall classes. Generally, the mine study area is characterized by arctic types of vegetation, with the dominance of dwarf shrubs and sedges. About half of the mine site is covered by vegetation types dominated by sedges alone (including tufted clubrush) or with dwarf shrubs. These are for the most part wetlands. Tall shrubs (American Dwarf birch, alpine bilberry) and trees (white spruce) are restricted to the transitional slope between the central plateau and Brisson Lake and along streams and some on the periphery of lakes (tamarack). Overall, the mine site is considered to have relatively low habitat diversity.

Wetlands are extensive and belong essentially to the fen type. The development of fens is favored by the surface run-off ubiquitous in this region. The topographical position of the central streamlined moraine plateau makes it an upstream source for 19 sub-watersheds. The physical landforms of longitudinal crests and large depressions also make the central plateau act as a "reservoir". The presence of dense basal till and of permafrost are other factors restricting soil permeability and drainage.

The vegetation survey did not identify any flora protected under Quebec's Threatened or Vulnerable Species Act, listed on Canada's Species at Risk list or include any federal-level COSEWIC vascular plant candidate species at the time. Only one species, starwort chickweed (Cerastium cerastioides), was considered rare in Canada by Argus and Pryer (1990) and is likely to be designated threatened or vulnerable in Quebec in administrative regions of the Bas-Saint-Laurent and Gaspésie-Îles-de-la-Madeleine. One species of moss, Meesia hexasticha, is uncommon in eastern North America according to current knowledge and is likely to be designated threatened or vulnerable (Gouvernement du Québec, 2012). These two species were found about 3 km north-east of the B-Zone near a stream in the Glaciofluvial Deposit Complex.

Given that vegetation was relatively homogenous in the Brisson Lake area, no exceptional plant habitat was found. However, micro habitats can shelter particular plant species. A few sectors or habitats appeared to be more ecologically interesting or sensitive: Wetland habitats along streams, ponds and small depressions on the Naskaupi glacial lake deposits in the Glaciofluvial Deposit Complex (north-east of B-Zone); small meadow marshes along the shores of Brisson Lake or at the mouth of small stream outlets in Brisson Lake; fens of the Naskaupi Glacial Lake Lowlands in the western part of the study area; riparian Shrub Fens of the central Streamlined Moraine Plateau, and snowbeds.

Studies to be carried out:

Vegetation

The dataset for the terrestrial environments is presumably accurate given the absence of any human activities. Therefore, no new field inventories are planned in the study areas. The terrestrial environment work plan will present only the approach to update the documentation on these environments.

Literature review:

In order to obtain a current picture of the terrestrial environments present at the mine site, all available and relevant databases will be consulted in order to update information on potentially important terrestrial habitats. The databases consulted will be used to detect the presence of protected areas or exceptional habitats, or to gather any other information relevant to assessing the ecological value of terrestrial environments. The following databases will be consulted:

- Carte interactive Forêt ouverte of the ministère des Ressources naturelles et des Forêts (MRNF, 2023)
- Liste des habitats d'espèces floristiques menacées ou vulnérables du Québec (MELCCFP, 2023c)
- List of ecological and wilderness reserves in the province of Newfoundland and Labrador (Government of Newfoundland & Labrador, 2023a)
- List of Newfoundland and Labrador provincial parks (Government of Newfoundland & Labrador, 2023b)
- 2011-2012 vegetation inventory report for Quest Rare Minerals Ltd. in the Strange Lake area, Zone B (AECOM, 2013d)

Wetlands

The purpose of the wetlands work plan is to present in detail the methodology that will be used to identify, delineate and characterize the wetlands present in the study area. The proposed wetland methodology will follow the recommendations of the Quebec government (Lachance et al., 2021).

Literature review:

Prior to the start of field inventories, a literature review will be carried out to obtain the most up-to-date information required for field preparation and wetland characterization. The following databases will be consulted:

- Données de milieux humides potentiels de la carte interactive du MELCCFP (MELCCFP, 2023b)
- Plan régional de conservation des milieux humides de CIC pour la région administrative du Nord du Québec (CIC, 2009a)
- 2011-2012 vegetation inventory report for Quest Rare Minerals Ltd. in the Strange Lake area, Zone B (AECOM, 2013d)

Survey sites selection:

From the 2011 photo-interpretation of the study area and information gathered from any other relevant databases, wetlands will be classified according to their type (marsh, shrub swamp, treed swamp, pond or wooded or open peat bog) as required by Lachance et al. (2021). Considering that wetlands located north of the 49th parallel may have different characteristic from those observed in southern Quebec, the classes of wetlands and their definitions provided by Lachance et al. (2021) may lack some precision for northern wetlands. Thereby, types of wetlands will be adapted if necessary, according to *The Canadian Wetland Classification System* (National Wetlands Working Group,1997) which defines tundra specific wetland types.

Using photo-interpretation, sampling stations will be positioned within the study area, according to the following criteria:

- Station will be positioned in an area where the vegetation is homogeneous at the wetland level;
- The number of stations per homogeneous vegetation unit (HVU) will be informed by the recommendations developed by Lachance et al. (2021) in the context of a highly homogeneous vegetation unit in terms of floristic species, soil conditions and hydrological indicators. However, as the project is north of the 49th parallel, the MELCCFP has confirmed that this Guide does not need to be fully applied to the Strange Lake Project (Jessica Hawey, pers. Comm. May 5, 2023). Thus, adaptations can be applied to the number of stations to be carried out in northern environments compared to what is proposed for southern Quebec in Lachance et al. (2021). Discussions will be held with concerned governments to adapt the number of stations required in a northern conditions context;
- At least one station will be located in each wetland or wetland class forming part of a complex.

The position of the stations can be adjusted to the terrain, depending on the actual characteristics of the wetlands.

Field surveys:

The inventories will be carried out at a time of year when the floral species can be identified, i.e. during the flowering period. Generally, inventory periods should be between July and September for plant species located at this latitude.

In the province of Quebec, wetland characterization and delineation need to comply with the methodology proposed in the guide *Identification et délimitation des milieux humides du Québec Méridional* (Lachance et al., 2021). However, as mentioned before, it has been confirmed that this Guide does not need to be fully applied to the Strange Lake Project since the project is located north of the 49th parallel (Jessica Hawey, pers. Comm. May 5, 2023). The methodology will therefore be adapted to northern particularities if necessary.

According to Lachance et al. (2021), the boundary of a wetland should be positionned at the point where it moves from a predominance of facultative or obligate wetland vegetation to a predominance of terrestrial vegetation. However, the water status of northern plants is often unknown or not listed in Lachance et al. (2021). Therefore, this criterion will be applied if possible and a special attention will be paid to any general vegetation change to help in the wetland delineation process. The taxonomy used is that of the Canadian Vascular Plant Database (VASCAN) (Brouillet et al., 2010+).

In addition to botanical criteria, the determination of a wetland boundary according to Lachance et al. (2021) requires consideration of edaphic criteria (soil type, drainage, and presence of speckles) and hydrological criteria (signs of water withdrawal, high water table, etc.). Consequently, soil borings will be carried out whenever possible to validate the nature of the topsoil and the presence of speckles. However, some soil components, such as drainage for example, will require adaptation given that the Guide is not adapted to northern territories. Any physical markings associated with the presence of water in the environment will also be noted (blackish litter, water-saturated soil, etc.).

For each station, the following information will be recorded:

- Validation of wetland class (pond, marsh, swamp, bog, etc.) and type;
- General description of the site;
- Presence or absence of a regular or intermittent watercourse or other hydrological link;
- Assessment of plant species cover, by height stratum;
- Detailed soil characterization;
- Identification of primary and secondary hydrological indices;
- Opportunistic inventory of animal species (songs, tracks, faeces, direct observations, etc.);
- Presence of endangered or invasive plant species;
- Presence and description of natural and anthropogenic disturbances;
- At least one photograph of each station;
- At least one soil photograph for each station.

Invasive plant species

The invasive plant species work plan is intended to describe in detail the methodology that will be implemented during future inventories in order to detect any invasive plant species that may be present in the study areas.

Literature review:

In order to obtain the most up-to-date information on invasive plant species present or potentially present in the study areas, a literature review will be carried out prior to the field inventories. This literature review will establish a list of the various invasive plant species present on the territory and considered as such by the various levels of government. To this end, the following databases will be consulted:

- Interactive map from MELCCFP's SENTINELLE tool (MELCCFP, 2023f)
- List of invasive plant species in Newfoundland and Labrador
- Guide to invasive plants in Canada (Government of Canada, 2023c)
- 2011-2012 vegetation inventory report for Quest Rare Minerals Ltd. in the Strange Lake area, Zone B (AECOM, 2013d)

Field surveys:

No specific surveys for invasive plant species are planned for future field surveys. However, particular attention will be given to invasive plant species during all inventories and trips carried out in the study areas. Generally, the survey period should be between July and September for plant species located at this latitude. If an invasive plant species observation is made at a station or incidentally in the study areas, the following information will be collected:

- Species identification;
- Demographic description (isolated individual, colony, number of individuals, etc.);
- Assessment of species cover;
- Location of the individual or outline of the colony using GPS points;
- Photographs.

14.2.1.2 Road Corridor, Container Storage and Handling Facilities (northern project components)

A total of 68 plots were sampled in 23 different areas of the road corridor. A total of 148 vascular plant species were found in the 400 m strip along the proposed road alignment. Seventy-one ecological types were defined on the basis of vegetation structure (or potential vegetation), height of the shrub layer, surficial material (combination of thickness, texture and drainage) and particular physical features. These were lumped into 25 vegetation subclasses and generalized into 17 overall classes. The road corridor passes through three ecological Land Regions and vegetation types vary from one to another. The first third of the road corridor (~75 km) is inside the Western Plateau Land Region (Map 14-4), as the mine site and vegetation are very similar: 60% is described as Arctic Land communities largely dominated by Dwarf Shrublands and the other 40% is described as wetland communities, dominated by Sedge Fens, then by Shrub Fens. The Central Range Land Region, which covers the upland region from the Western Plateau to the Reid Brook Valley near Anaktalak Bay, is also dominated by the Shrubland class, representing 57% of the area, with Tall Shrubland subclasses occupying more area within this region than in the Western Plateau Region. The area occupied by fens is generally lower, covering about 13% of the area (Sedge Fen and Shrub Fen classes combined). Rocky Barrens (Bareland or Mixedland classes) occupy approximately 14% of land and Coniferous Moss Forests occupy approximately 8% of the area. The lowland valleys of Ikadlivik Brook and Reid Brook belong to the Fraser River Land Region. Nearly three quarters of this region is comprised of forested communities dominated by Coniferous Moss Forests (63%), while Shrublands occupy about 13% cover.

Wetlands form an important part of the landscape in the first 95 km road alignment section from the mine. In terms of floristic diversity, fens rank the highest, especially in a few specific locations such as the edges of streams, along slopes and other individual fens. Given the overall low diversity of the dominant dwarf shrub tundra, these areas dramatically contribute to the overall floristic diversity of the region. Palsa fens, uncommon in that area, may represent a sensitive feature.

The road corridor survey did not identify any vascular plants listed under provincial endangered species legislation (Quebec, Newfoundland and Labrador), listed as a Species at Risk in Canada or included among the federal-level COSEWIC vascular plant candidate species. Since no observed vascular plant has official protection in Labrador, rare species have been identified through provincial ranking criteria ranging from S1 to S3, as defined by the NatureServe International Network.

Ten rare plant species were encountered in the road corridor study area, including four species (Williams' Sedge, Saint John River locoweed, tufted pearlwort, and nard sedge) with S1 ranking (five or fewer occurrences in Labrador), and six species (alpine bartsia, milky draba, alpine cudweed, elephant’s-head lousewort, hairy butterwort, and northern buttercup) listed as S2 (rare throughout their range). Fourteen uncommon (S3) species are also presented and compiled to document the presence of these species for inland Labrador.

In addition to the riparian habitats (shrub fens, shrub swamps, marshes or sedge fens) and some particular fens such as slope fens, the following habitats have the potential to contain rare species and high species diversity: the rocky shores found along upper Ikadlivik Brook, rocky summits near large rivers, and, especially, exposed rocky summits in the geological province of Nain. Within the Ikadlivik and Little Reid Brook valleys (Fraser River Land Region), no distinct habitats were observed, however sampling plots in these areas are very few in the scope of this study.

Studies to be carried out:

Vegetation

The dataset for the terrestrial environments is presumably accurate given the absence of any human activities. Therefore, no new field inventories are planned in the study areas. The terrestrial environment work plan will present only the approach to update the documentation on these environments.

Literature review:

In order to obtain a current picture of the terrestrial environments present in the road corridor, all available and relevant databases will be consulted in order to update information on potentially important terrestrial habitats. The databases consulted will be used to detect the presence of protected areas or exceptional habitats, or to gather any other information relevant to assessing the ecological value of terrestrial environments. The following databases will be consulted:

- List of ecological and wilderness reserves in the province of Newfoundland and Labrador (Government of Newfoundland & Labrador, 2023a)
- List of Newfoundland and Labrador provincial parks (Government of Newfoundland & Labrador, 2023b)
- 2011-2012 vegetation inventory report for Quest Rare Minerals Ltd. in the Strange Lake area, Zone B (AECOM, 2013d)

Wetlands

The purpose of the wetlands work plan is to present in detail the methodology that will be used to identify, delineate and characterize the wetlands present in the study area. The proposed wetland methodology will be inspired by previous surveys carried out in the study area in 2011-2012.

Literature review:

Prior to the start of field inventories, a literature review will be carried out to obtain the most up-to-date information required for field preparation and wetland characterization. The following databases will be consulted:

- Données de milieux humides potentiels de la carte interactive du MELCCFP (MELCCFP, 2023b)
- Plan régional de conservation des milieux humides de CIC pour la région administrative du Nord du Québec (CIC, 2009a)
- 2011-2012 vegetation inventory report for Quest Rare Minerals Ltd. in the Strange Lake area, Zone B (AECOM, 2013d)

Survey sites selection:

When possible, vegetation classification produce during the 2011-2012 vegetation inventory report (AECOM, 2013d) will be used, as some portions of the road corridor of the present study are the same as it were during the Quest Rare Minerals Project. Indeed, a general classification of vegetation based on automatic classification of SPOT satellite data and analyzed with the eCognition software, was completed, and mapped for the entire length of the 5 km wide corridor of the Quest Rare Mineral Project. A more detailed description and mapping of vegetation and surficial geology was also completed for the entire corridor, but only for a 400 m wide cross section centered on proposed preliminary road alignments. Since no human activities took place on the study area, the data are presumably accurate, nevertheless, dataset will be update if new data available.

To complete de vegetation classification, a photo-interpretation of the wetlands in the study areas will be carried out, based on stereoscopic screen analyses of the most recent orthophotographs and information from any other relevant databases. Wetlands will be classified according to their type (marsh, shrub swamp, treed swamp, pond or wooded or open peat bog) as defined by Lachance et al. (2021). Considering that wetlands located north of the 49th parallel may have different characteristic from those observed in southern Quebec, the classes of wetlands and their definitions provided by Lachance et al. (2021) may lack some precision for the northern wetlands. Thereby, types of wetlands will be adapted if necessary, according to *The Canadian Wetland Classification System* (National Wetlands Working Group,1997) which defines tundra specific wetland types.

Sampling stations will be positioned within the study area to validate the photo-interpretation and vegetation classification. The number of stations needed for validation will be to discuss with the concerned governments.

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composante du projet / Project Component

- Site potentiel des installations portuaires / Potential site for Port Facilities

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Région écologique / Land Region

- Central Ranges
- Fraser River
- Mistastin Lake
- Saglek / Hopedale
- Western Plateau

District écologique / Land Region

D5 - Western Plateau North
D6 - Western Plateau Central
D7 - Western Plateau East
G4 - Central Ranges East
G5 - Central Ranges West
G6 - Central Ranges South
H2 - Fraser River Lowlands
H3 - Fraser River Valleys
I1 - Saglek / Hopedale North
I2 - Saglek / Hopedale South
J1 - Mistastin Lake Shore
J2 - Mistastin Lake Brrens
J3 - Mistastin Lake East

Other / Autre

- Frontière Québec et Labrador / Quebec and Labrador border

1:360 000
0 4 8 km
NAD 1983 UTM Zone 20N

Source:
Topographic data / Données topographiques: RNCan (2022)
Land Region and District / Région et district écologique: JWEL (1997)

Carte 14-4
Régions et districts écologiques - Physiographie

Map 14-4
Land Regions and Districts - Physiography

AECOM

\\ca.aecomnet.com\Canada\Montreal\DCS\Projects\ENV\60697123_Mine_Strange_Lake_SLGIS_CAD_SIG\Livrables\09_produit\DetailedProjectDescription\

Field surveys:

The inventories will be carried out at a time of year when the floral species can be identified, i.e. during the flowering period. Generally, inventory periods should be between July and September for plant species located at this latitude.

The proposed wetland methodology will follow the recommendations of the Quebec government (Lachance et al., 2021). However, as mentioned before, methodology will be adapted to northern particularities if necessary.

According to Lachance et al. (2021), the boundary of a wetland should be placed at the point where it moves from a predominance of facultative or obligate wetland vegetation to a predominance of terrestrial vegetation. However, the water status of northern plants is often unknown or not listed in Lachance et al. (2021). Therefore, this criterion will be applied if possible and a special attention will be paid to any general vegetation change to help in the wetland delineation process. The taxonomy used is that of the Canadian Vascular Plant Database (VASCAN) (Brouillet et al., 2010+).

In addition to botanical criteria, the determination of a wetland boundary according to Lachance et al. (2021) requires consideration of edaphic criteria (soil type, drainage and presence of speckles) and hydrological criteria (signs of water withdrawal, high water table, etc.). Consequently, soil borings will be carried out whenever possible to validate the nature of the soils and the presence of speckles. However, some soil components, such as drainage for example, will require adaptation given that the Guide is not adapted to northern territories. Any physical markings associated with the presence of water in the environment will also be noted (blackish litter, water-saturated soil, etc.).

For each station, the following information will be recorded:

- Validation of wetland class (pond, marsh, swamp, bog, etc.) and type;
- General description of the site;
- Presence or absence of a regular or intermittent watercourse or other hydrological link;
- Assessment of plant species cover, by height stratum;
- Detailed soil characterization;
- Identification of primary and secondary hydrological indices;
- Opportunistic inventory of animal species (songs, tracks, faeces, direct observations, etc.);
- Presence of endangered or invasive plant species;
- Presence and description of natural and anthropogenic disturbances;
- At least one photograph of each station;
- At least one soil photograph for each station.

Invasive plant species

The invasive plant species work plan is intended to describe in detail the methodology that will be implemented during future inventories in order to detect any invasive plant species that may be present in the study areas.

Literature review:

In order to obtain the most up-to-date information on invasive plant species present or potentially present in the study areas, a literature review will be carried out prior to the field inventories. This literature review will establish a list of the various invasive plant species present on the territory and considered as such by the various levels of government. To this end, the following databases will be consulted:

- Interactive map from MELCCFP's SENTINELLE tool (MELCCFP, 2023f)
- List of invasive plant species in Newfoundland and Labrador
- Guide to invasive plants in Canada (Government of Canada, 2023c)
- 2011-2012 vegetation inventory report for Quest Rare Minerals Ltd. in the Strange Lake area, Zone B (AECOM, 2013d)

Field surveys:

No specific surveys for invasive plant species are planned for future field surveys. However, particular attention will be given to invasive plant species during all inventories and trips carried out in the study areas. Generally, the survey period should be between July and September for plant species located at this latitude. If an invasive plant species observation is made at a station or incidentally in the study areas, the following information will be collected:

- Species identification;
- Demographic description (isolated individual, colony, number of individuals, etc.);
- Assessment of species cover;
- Location of the individual or outline of the colony using GPS points;
- Photographs.

14.2.1.3 Separation Plant (Sept-Îles project component)

Sept-Îles is located in the bioclimatic zone of balsam fir dominated stands with black spruce and black spruce dominated stands with moss. More precisely, the study area is characterized by balsam fir dominated stands with white birch and mountain maple on mesic sites. Where soils are well drained, black spruce dominated stands with moss are found, while balsam fir dominated stands with white birch and white alder characterize hydric sites. The information provided by the port of Sept-Îles (dated 2023-02-03) suggests the presence of at least three bogs at the proposed separation plant site (Map 14-2). Other bogs and swamps are also found along the Au Foin River.

Studies to be carried out:

Vegetation

The proposed study area of the separation plant will be subject to new field inventories. Thus, new terrestrial vegetation surveys will be carried out.

Literature review:

In order to obtain a current picture of the terrestrial environments present at the separation plant, all available and relevant databases will be consulted in order to update information on potentially important terrestrial habitats. The databases consulted will be used to detect the presence of protected areas or exceptional habitats, or to gather any other information relevant to assessing the ecological value of terrestrial environments. The following databases will be consulted:

- Carte interactive Forêt ouverte du ministère des Ressources naturelles et des Forêts (MRNF, 2023)
- Liste des habitats d’espèces floristiques menacées ou vulnérables du Québec (MELCCFP, 2023c)

Wetlands

The purpose of the wetlands work plan is to present in detail the methodology that will be used to identify, delineate and characterize the wetlands present in the study area. The proposed wetland methodology will follow the recommendations of the Quebec government (Lachance et al., 2021).

Literature review:

Prior to the start of field inventories, a literature review will be carried out to obtain the most up-to-date information required for field preparation and wetland characterization. The following databases will be consulted:

- Données de milieux humides potentiels de la carte interactive du MELCCFP (MELCCFP, 2023b)
- Plan régional de conservation des milieux humides de CIC pour la région administrative de la Côte-Nord (CIC, 2009b)

Survey sites selection:

A photointerpretation of the wetlands in the study areas will be carried out, based on stereoscopic screen analyses of the most recent orthophotographs and information from any other relevant databases. Wetlands will be classified according to their type (marsh, shrub swamp, treed swamp, pond or wooded or open peat bog) as defined by Lachance et al. (2021).

Using photointerpretation, sampling stations will be positioned within the study area, according to the following criteria:

- Stations will be positioned in an area where the vegetation is homogeneous at the wetland level;
- The number of stations per homogeneous vegetation unit (HVU) will be determined according to the recommendations developed by Lachance et al. (2021) (Table 14-15);
- At least one station will be located in each wetland or wetland class forming part of a complex.

For HVUs larger than 10 ha, the inventory effort per area may decrease. A sampling strategy adapted to the site and meeting recognized scientific criteria could be developed and proposed in conjunction with the various government authorities.

In addition, the position of the stations can be adjusted to the terrain, depending on the actual characteristics of the wetlands.

Table 14-15: Recommended number of stations based on UVH area in standard and homogeneous vegetation conditions

Surface area (ha)	Number of stations	
	Standard conditions	Homogeneous vegetation conditions
≤ 0,003*	0	0
]0,003-0,3]	1	1
]0,3-0,6]	2	2
]0,6-1]	3	3
]1-10[	4 to 30 (3 for each additional ha)	4 to 12 (1 for each additional ha)
≥ 10	Variable	Variable

*A wetland that occupies more than 0.003 ha, but where all the HVUs occupy less than 0.003 ha, must nevertheless be inventoried. In this case, the professional in charge of the file will suggest an appropriate method.

Source : adapted from Lachance *et al*. 2021

Field surveys:

The inventories will be carried out at a time of year when the floral species can be identified, i.e. during the flowering period. As the flowering period of the various species is not always identical, two inventory periods may be necessary, including one at the beginning of the season for the earliest species. Generally, inventory periods should be between June and September for plant species located at this latitude.

In the Quebec province, wetland characterization and delineation must comply with the methodology proposed in the guide Identification et délimitation des milieux humides du Québec Méridional (Lachance et al., 2021).

Following the simplified delineation of Lachance et al. (2021), the boundary of a wetland will thus be placed at the point where it moves from a predominance of facultative or obligate wetland vegetation to a predominance of terrestrial vegetation. The taxonomy used is that of the Canadian Vascular Plant Database (VASCAN) (Brouillet et al., 2010+).

In addition to botanical criteria, the determination of a wetland boundary according to Lachance et al. (2021) requires consideration of edaphic criteria (soil type, drainage and presence of speckles) and hydrological criteria (signs of water withdrawal, high water table, etc.). Consequently, soil borings will be carried out whenever possible to validate the nature of the topsoil and the presence of speckles. Any physical markings associated with the presence of water in the environment will also be noted (blackish litter, water-saturated soil, etc.).

For each station, the following information will be recorded:

- Validation of wetland class (pond, marsh, swamp, bog, etc.) and type;
- General description of the site;
- Presence or absence of a regular or intermittent watercourse or other hydrological link;
- Assessment of plant species cover, by height stratum;
- Detailed soil characterization;
- Identification of primary and secondary hydrological indices;
- Opportunistic inventory of animal species (songs, tracks, faeces, direct observations, etc.);
- Presence of endangered or invasive plant species;
- Presence and description of natural and anthropogenic disturbances;
- At least one photograph of each station;
- At least one soil photograph for each station.

Invasive plant species

The invasive plant species work plan is intended to describe in detail the methodology that will be implemented during future inventories in order to detect any invasive plant species that may be present in the study areas.

Literature review:

In order to obtain the most up-to-date information on invasive plant species present or potentially present in the study areas, a literature review will be carried out prior to the field inventories. This literature review will establish a list of the various invasive plant species present on the territory and considered as such. To this end, the Interactive map from MELCCFP's SENTINELLE tool (MELCCFP, 2023f) will be consulted.

Field surveys:

No specific surveys for invasive plant species are planned for field surveys. However, particular attention will be given to invasive plant species during all inventories and trips carried out in the study areas. Generally, the survey period should be between June and September for plant species located at this latitude. If an invasive plant species observation is made at a station or incidentally in the study areas, the following information will be collected:

- Species identification;
- Demographic description (isolated individual, colony, number of individuals, etc.);
- Assessment of species cover;
- Location of the individual or outline of the colony using GPS points;
- Photographs.

14.2.2 Fish and Fish Habitat (FAFH)

14.2.2.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The following subsections describes the aquatic environment based on reference baseline data acquired in 2011-2012 at the mine site, and at the three main water crossings (#116,177,509) along the road corridor (Option A). This dataset is probably still accurate given the absence of any human activities since 2012. However, current data acquisition (field surveys conducted in 2023-2024) will be used to confirm the current habitats and document any potential changes. In 2023, FAFH data acquisition was completed in Québec (mine site, 13 WC). Nevertheless, the majority of the FAFH data acquisition will be carried out in 2024.

For both of the Option C of the single lane access road, FAFH will also be assessed in 2024 under a Marine Environment Baseline Studies in Voisey's Bay. See Section 14.3 for more details on the marine program workplan.

14.2.2.1.1 Fish Habitat Assessment

Mine Site

Although cold waters are characterized as oligotrophic environments, such ecosystems support many trophic levels, including fish. However, species and densities of individuals are generally lower in comparison to southern or more temperate areas. Aquatic life in the lower part of the watersheds is in general richer in abundance and diversity than in the upper headwaters, or in some of the smaller surrounding watersheds, where connectivity is interrupted and obstacles to fish passage exist. At the mine site, the overall fish habitat encountered consisted of permanent and intermittent streams, some small lakes with connecting channels, isolated ponds that may receive surface water runoff from the surrounding landscape, and two major lakes: Lake Brisson and Lake Napeu.

Aquatic vegetation was absent, and instream cover very low in abundance and distribution. No thermocline was observed in August 2012 and, therefore, temperature is not influencing oxygen availability throughout the water column. Dissolved oxygen concentrations were high (7.9 to 9.75 mg/L) for the range in water temperature of 14.7 to 15.5 °C from the bottom to the surface of the lake. In 2023, no fish sampling was conducted in Lake Brisson (see Section 14.1.9 for surface water quality). Lake Brisson is the largest lake located in the study area covering 3,220.9 ha. Therefore, only the area likely to be influenced by the development of the mining site was surveyed during aquatic field studies conducted in 2011-2012. Likewise, given a large number of water crossings along the road corridor (450 on different road alignment variants), aerial assessment of flow type (intermittent, permanent) was made everywhere, but sampling occurred mostly at the three main water crossings, as well as other water crossings with permanent flow and large watershed area (>4 km²; n=51). Habitat type determination was made according to DFO guidelines (McCarthy *et al.*,*draft,* revised 2010).

The fish habitat and community characteristics were recorded over an electrofishing reach (100 m²) and were made according to MRNF Common Standards namely the *Guide de normalisation des méthodes d'inventaire ichtyologique en eaux intérieures* (Service de la faune aquatique, 2011). As per DFO Standard Methods (Sooley *et al.*, 1998), baseline information collected in the streams included the following fish habitat characteristics: flow pattern, flow type, channel width, substrates, riparian vegetation cover, water velocities and water depth. Most of the streams at the mine site provided feeding habitat for brook trout, and some rearing and potential spawning habitat based on the presence of fry.

Road Corridor

Along the road corridor Option A, from the 54 ground surveys carried out in 2011-2012 using electrofishing on a 100 m reach (50 m downstream and upstream of water crossings), 25 were determined to be fishless (46%). Many of the 25 (44%, n=11) had natural obstacles to fish passage and migration within the surveyed section. Obstacles were of two types: vertical drop (cascade, waterfalls) and low flow barrier (low water level flowing over exposed boulders or bedrock). New FAFH Surveys will be completed in 2024 for the current options of the access road (Option A, Option C). A full Marine Baseline Program will also be completed in Voisey's Bay (Option C) in 2024 (see Section 14.3).

14.2.2.1.2 Fish Communities

Mine Site

At the mine site, fishing efforts were conducted in August 2011 and August 2012, using several types of fishing gear (gillnets in 2011, trapnets and fish pots in 2012, and electrofishing in the streams). Fish were captured at all but two of the fishing stations. As station 3F along the access road (or EF-15 from 2011-212) is fishless, its drainage is currently identified for progressive discharge of treated water (see Sections 9.2.13 and 24.3.2.6), should discharge be necessary.

At the mine site, the fish community is composed of eight species (Arctic char, brook trout, lake trout, round whitefish, longnose sucker, burbot, lake chub and mottled sculpin), typically found in cold freshwater thermal regimes. Longnose sucker and lake trout were the most abundant species in lakes, while brook trout was the dominant species caught in streams. Juveniles of lake trout, lake chub and longnose sucker were also found in some streams. Both lake trout and Arctic char were found to be using the same lacustrine habitat. Most water courses with fish presence were represented by an aquatic ecosystem dominated by brook trout owing to suitable heterogeneous habitat characteristics including habitat types and substrates that provide holding, rearing and/or potential spawning habitats for the species. Fish community surveys will continue in 2024 and will cover all aquatic habitats in the project footprint (surrounding lakes and watercourses).

Road Corridor

Along the road corridor, Option A, salmonid young-of-the-year individuals were caught at 10 water crossings, and at each the three main water crossings (#116, 177, and 509). The presence of young-of-the-year indicated probable spawning at or nearby the site of observation. One lake trout was caught by angling at sampling location #116 (proposed bridge 1) during the spawning assessment.

Both resident and anadromous forms of brook trout were thought to be represented in the catch although this was not confirmed in the surveys. The anadromous form was considered to be mainly associated with the eastern portion of the road corridor (WC#509 3rd main water crossing on Option A) and at water crossings associated with Ikadlivik Brook; where Arctic char and Atlantic salmon were also part of the aquatic fish community. Two stocks of Arctic char reside in the eastern end of the road corridor: the Nain stock and the Voisey's Bay stock. Components of Voisey's Bay stock can migrate to accessible freshwater habitat in Reid Brook, Kogluktokoluk Brook (including its tributary, Ikadlivik Brook), where a large amount of freshwater habitat is available (Vale Inco, 1997). No information has been validated yet in terms of fish communities along Option C of the access road, but similarities to Option A should be noted in 2024. The marine program to be conducted in Voisey's Bay in 2024 will allow for the assessment of fish communities (see Section 14.3).

14.2.2.1.3 Salmonid Spawning Sites

Mine Site

At the mine site, salmonid spawning was assessed in 2012 with the installation of 30 egg collectors on two potential salmonid spawning areas in Lake Brisson to ensure that these sensitive habitats are not impacted by the project. Of the potential habitats surveyed, one spawning site was confirmed in October 2012 along an esker near a tributary leading to Lake Napeu Kainiut. Two sizes of eggs were collected; the smallest eggs (2.5 to 3.5 mm) being from the Arctic char females (2.5 to 4.3 mm), and largest (5 to 6 mm) from lake trout females (Scott and Crossman, 1973). This area can now be considered a confirmed spawning ground for salmonids (Arctic char, lake trout). However, no eggs were observed in the area closer to the B-Zone deposit. Fall investigations were conducted at sites with preferential characteristics for salmonid reproduction at stream habitats and surrounding small lakes. The stream reaches covered during this assessment ranged from 65 to 261 m long. No eggs or redds were observed in the streams during this spawning investigation. An aggregation of 25 adults brook trout was observed in proximity to spawning habitats (gravel beds), and spawning was therefore inferred in this reach. The water temperature at time of investigation was 6.77 °C which is consistent with preferred brook trout spawning conditions. This site is located at the entrance to the bay proximal to the spawning ground along the esker. Salmonid spawning was investigated again in early October 2023 through observations in the watercourses showing potential habitats (1F, 2F, 12) along the access road. Lake Brisson was not surveyed. Two water crossings in Québec showed potential spawning (2F, 12). Brook trout spawners were observed at 2F, whereas three different areas of potential spawning grounds were observed at #12 (1 downstream and 2 upstream of the crossing). Spawning investigations at the mine site and access road in Québec will be performed again in 2024.

Road Corridor

Along the road corridor Option A in Labrador, 15 water courses were identified during ground surveys in 2011-2012 as having habitat characteristics suitable for salmonid reproduction. These sites were re-visited again during the spawning period, e.g. between October 1st and October 6th 2012, to assess spawning activity. Salmonid spawning grounds were confirmed, based on observations of redds and spawners, for four water courses including the third main water crossing (#509). The spawning habitat found at proposed bridge 3 (#509) is indirectly connected to Ikadlivik Brook, through Reid Brook, which is normally considered as an extended tributary of the Kogluktokoluk Brook and Ikadlivik Brook system. A helicopter survey was conducted October 4th 2012 on Reid Brook along Ikadlivik Brook from stream crossing (main water crossing #509) to Reid Pond. Many potential Arctic char spawners (approximately 50) were observed at two different locations in Ikadlivik Brook within a reach of high spawning potential. Only brook trout redds were observed at crossing #509, , and no char redds were apparent. However, many char spawners were observed upstream of Reid Falls, which is considered a passable obstacle during the spawning period, and Arctic char have been reported spawning along Reid Brook. The anadromous Arctic char of Voisey's Bay stock would exhibit a general distribution pattern along the main stem of the Reid Brook, Kogluktokoluk Brook and Ikadlivik Brook system. The freshwater environment is therefore used for spawning, and rearing, and most of the Arctic char spawners in Reid Brook (below Reid Falls) move into Ikadlivik Brook for over-wintering. The estuarine and marine environments are used for feeding during the summer months (Vale Inco, 1997). At proposed bridge 1 (#116), the capture of a male extruding milt upstream of crossing indicated possible proximate spawning. In 2023, potential sites were visited again along Option A during the spawning season (116, 177, 269, 331, 393, 398, 509, 555), and assessment made through ground observations and helicopter surveys. From these, confirmed spawning (spawners, nests/redds) was reported downstream of three water crossings (#331, 393, 509). Confirmed spawning is also reported in the Ikadlivik main steam in the vicinity of #269 and 393. For crossing #116, four potential spawning sites were found, but rather upstream in the Kogaluk main stem. Spawning investigations along Option C will be performed in 2024.

14.2.2.1.4 Benthic Invertebrates

Benthic macroinvertebrates communities within the study area are representative of the ecoregion, e.g. eastern Canadian Taïga Shield and George Plateau. Similar to the fish communities, the taxa richness and diversity are low compared to southern areas in temperate regions. Several factors may be responsible for the overall low benthos including substrate type and sediment quality, and oligotrophic conditions (low productivity, low plankton biomass, low nutrients). At the mine site, stream stations were less diversified (mean of 5 ± 2 taxa) than lacustrine stations (mean of 7 ± 3 taxa). The benthic invertebrate communities present in the lacustrine and stream stations sampled were composed of species relatively tolerant to nutrient enrichment and increased trace metal contamination in water. Sampling will occur again in 2024, along with the sediment sampling at the mine site.

Along the road corridor (Option A), the benthic invertebrate community identified at the three main water crossings (proposed bridges) show variable composition, densities and taxonomic richness. The highest benthic density was obtained at water crossing #116 (proposed bridge 1: 2,154 org./m²), and the lowest, at water crossing #177 (bridge 2: 231 org./m²). The highest taxonomic richness (n=10 taxa) was observed at water crossing #509. Two proposed bridges (water crossing #116 and 177) were dominated by *Chironomidae* larvae, whereas bridge 3 (water crossing 509) was dominated evenly by four taxa: *Chironomidae* larvae, *Ceratopogonidae* sp., *Cyprididae* sp. and *Chloroperlidae* sp, and the absence of *Sphaeriidae*. Plecoptera *Chloroperlidae* were observed only at proposed bridge 3 (mine site included) including benthic organisms known to be less tolerant to pollution, with the Plecoptera *Chloroperlida*e and Plecoptera *Leuctridae* being very intolerant to water pollution (Mandaville, 2002). No additional sampling of benthic invertebrates is planned along the access road in 2023-2024. Nevertheless, the Marine Baseline in Voisey's Bay will address invertebrates (see Section 14.3).

14.2.2.1.5 Biological Monitoring (fish tissues)

According to Environment Canada (2012), the species selected for tissue analyses should be, if present, a recreational, subsistence and/or commercial species. On a site-specific basis, the species selected for tissue analysis should be chosen based on local consumption (excluding commercial species that may not contribute to local consumption). Tissue analyses should be conducted on eight samples, if possible, from one sex (male or female) and age class (Environment Canada, 2012).

At the mine site, lake trout was designated as the preferred species for tissue analyses. Fish tissue samples (muscle or fish flesh) were analyzed in the laboratory in 2012 for the following elements:

- Metals (Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Ti, Tl, U, V, Zn);
- Mercury (Hg);
- Rare earth elements (Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y) and associated minerals, including, niobium (Nb), zirconium (Zr), as well as uranium (U) and thorium (Th).

Studies to be carried out (2023-2024)

The acquisition of up-to-date data began in 2023 and will continue in 2024 as per the current planning at the mine site, and at the water crossings along the two options (Option A, Option C) of the access road in Quebec and Labrador. Sampling will comply with the modernized *Fisheries Act* (2019) under subsections 34(2), 36(5), and 38(9) annexed to Metal and Diamond Mining Effluent Regulations (MDMER, 2023). Those regulations have more stringent requirements for the fish, fish habitat protection and pollution prevention than the previous regulations. For example, these regulations prohibit the deposit of deleterious substances in water frequented by fish unless authorized and prohibits combining the effluent with water or any other effluent for the purpose of diluting effluent before it is deposited. In addition, where there is a potential effect to species at risk (SAR) or species of conservation concern (SOCC), death of fish, and harmful alteration, disruption or destruction (HADD) of fish habitat, the potential effects need to be addressed with the agencies.

Moreover, the new Appendix, *Annexe I Autre renseignements requis pour un projet minier* (Mine ou usine de traitement de minerai ; MELCC, 2022), from part II of the *Règlement relative à l'évaluation et l'examen des impacts sur l'environnement de certains projets* (chapitre Q-2, r.23.1) of the *Loi sur la qualité de l'Environnement (LQE)* for mining projects, does trigger many new requirements. For the aquatic environment, a specific guideline was developed and published in 2017 by the MDDELCC: *Guide de caractérisation physicochimique de l'état initial du milieu aquatique avant l'implantation d'un projet industriel* (MDDELCC, 2017), and have specific requirements on the sampling of surface water and the sediment quality as mentioned in Sections 14.1.9 and 14.1.11 as well as in the hydrology and water management (Section 14.1.7). Compliance with Annexe I (MELCC, 2022) also require additional sampling to provide accurate and compliant information of the receiving environment before the implementation of a new mining project such as Torngat Metals.

The methods or guidelines described in SCF (2011) for Quebec are still current. However, these guidelines could impact the aquatic resources in Lake Brisson fish community because of the level of fishing effort needed for experimental fishing (population dynamics purpose). As the lake surface area is 3200 ha which would equal to 32 night-net, it could represent a take of 150 lake trout. V. Leclerc from MFFP (February 2023) provided a new (unpublished) guideline for northern habitats (MFFP, 2018) but this new guideline is not available to Fisheries and Oceans, Quebec Region. Upcoming fishing effort will consist of gillnetting again with adding deeper stations, e.g. less than 10 night-net fishing will be performed.

In terms of biological monitoring, contamination levels at a reference site for two fish species (lake trout, longnose sucker) will be investigated (MELCC, 2022), as prescribed by D. Laliberté (MELCC, February 2023). Fish and fish habitat (FAFH) assessment will also have to include other smaller lakes and connected streams that could be affected by the proposed mining infrastructures. A more exhaustive habitat characterization will be performed in order to assess the impacts and calculate the losses of fish habitats for all the lakes and watercourses likely to be impacted by the project at the mine site. This will include the upstream part of Napeu Lake where secondary effluents (from mine tailings sites) could flow. Gathering such precise data is important as the project aims at reducing to minimal any watercourse / water diversion related to the footprint of the projected infrastructures. When fully addressed, the results will give the engineering team information to decide which project variant should be kept in order to minimise environmental impacts of the project. The fish habitat assessment could also be optimized along the shore with drone photogrammetry data acquisition as it defines the elevation on the shores.

As per DFO Standard Methods in Labrador (Sooley *et al.*, 1998), baseline information for FAFH at water crossings along the road access will be including the following fish habitat characteristics:

1. Flow pattern, flow type (meso-habitat: falls/chute, rapids, run, riffle, lotic channel, flat/steady, glide, pool)
2. Channel width (channel wetted and bankfull width),
3. Substrate composition, riparian vegetation cover, water velocities,
4. Water depth and potential salmonid habitat (spawning, rearing, feeding, migration), such as described by McCarthy et al. (draft, revised 2010).

FAFH sampling periods will include aerial surveys at high water level (spring freshet and fall spawning investigation) and as well as summer (low-level) to avoid fish windows, increase electrofishing and vegetation inventory results. This assessment will help support considerations for the ecosystem, such as for Arctic char migrations and critical habitats, as well as important fishing locations for the communities.

As presented in Section 14.1.5.3, at the moment of this document submission, two options (Option A and Option C) are under study for the single lane access road. For Option A, the most studied yet (aerial and ground surveys 2011-2014, 2023), the alignment has 286 water crossings, 273 in Labrador and 13 in Quebec (see Table 14-7). From these, more than 50% of the water crossings are of intermittent flow (at least 143 in Labrador and at least 5 in Quebec; Table 14-7) based on validated aerial surveys, GIS and drainage analysis. For Option C, only desktop assessment provides an estimation of the number of water crossings. For Option C, in addition to the same 13 water crossings in Québec (common with alignment Option A), a total of 113 water crossings are encountered as a minimal using scale 1:50,000 for Option C1, and up to 298 water crossings for Option C2 (3D Satellite Image).

Again, the majority of streams have a reduced drainage upstream of crossing, and are of possible intermittent flow. Appendix E illustrates the position and drainage class of all water crossings (all options).

It is important to note that Option C is still under design. At the moment two sub alignment have been developed: Option C1 which represents the least environmental impacts, in terms of water crossings (scale 1:50,000) and the least impacts on land use, in terms of distance from popular creeks. However C1 would require blasting in a few areas. Option C2 represents the lowest road impacts in terms of construction and could be completely returned to pre-existing conditions at closure. However, this option is longer (188 km), and has more water crossing according to 3D Satellite Imagery and is much closer to very significant brooks (e.g. Konrad Brook) as well as fishing and hunting grounds. Discussions with the concerned communities will inform the final alignment.

The FAFH approach was provided to DFO in July 2023 and provides a screening of characterization efforts based on drainage/flow type but in consideration of aerial assessment. Information gathered at water crossing will be comprehensive enough to have a registry of each water crossing, habitat type, area impacted, and culvert size planned. Thus, *Best Management practise for the protection of freshwater fish habitat in Newfoundland and Labrador* (DFO, 2022), DFO policy for applying measures to offset adverse effects of FAFH (DFO, 2019ab), and interim code of practice (DFO, 2020ab) and Quebec MPO (2016) *Lignes directrices pour les traverses de cours d'eau du Québec* will be reference documents in the planning phase in order to minimize impact on fish passage through water crossing management. In 2023, the 13 water crossings from province of Quebec were surveyed (aerial, ground) along the access road in Québec and were completed on a 750 m study reach in 2023. Appendix E outlines each of the water crossings along the access road in Québec. Out of the 13, 9 water crossings are confirmed fish habitat (#2F, 10_11a, 10_11b, 12, 13, 15, 16, 17 et 18; Map 14-3), and four are salmonid fish habitats (#2F, 12, 16, 10_11a). Obstacles disrupting fish passage through vertical drops and low flow barriers were observed on four study reaches/water crossings. The FAFH at water crossings in Labrador will be assessed in 2024 for Option C.

Section 14.3 describes the marine program that will be performed in the marine waters of Voisey's Bay (Option C access road).

14.2.2.2 Separation Plant (Sept-Îles project component)

The Au Foin River was surveyed for fish in 2019 using one fyke net and two species of stickleback were reported, the threespine and the fourspine stickleback. Spawning of rainbow smelt is confirmed in the Au Foin River, along with Du Poste, Clet and Hall rivers (Calderon, 1996; MDDEP, 2009; OBV Duplessis, 2021). The presence of filamentous algae was reported has having influence on retaining/fixing eggs from the rainbow smelt (CRECN, 2016). The American eel is also reported to be using the Au Foin River (threatened in Canada according to COSEPAC/COSEWIC, 2012), and of concerns in Quebec (LEMVQ) (CRECN, 2016). A large number of eels was also reported by Calderon (1996), along the Hall and des Rapides rivers. An eel-ladder was designed and installed on the Hall river, at the Hall dam by AECOM in 2021 for OBV Duplessis in collaboration with the Conseil de la nation huronne-wendat (CNHW) and collaboration of the owner, la Société ferroviaire et portuaire de Pointe-Noire (SFPPN) in order to secure free passage upstream (OBV Duplessis, 2021).

A total of 21 fish species is reported in the Bay of Sept-Îles (CRECN, 2016). During the winter, the rainbow smelt is fished by recreative fishermen given the large concentration of this fish. DFO aquatic species at risk map (DFO, 2023) does not report critical habitat in the Bay of Sept-Îles. The presence of species at risk is nevertheless reported for one marine fish species, the spotted wolffish. Other species are marine mammals.

More details on fish species and marine mammals occurring in the Bay of Sept-Îles, Archipelago and the general environment are presented in Sections 14.3.4.1.3 and 14.3.4.1.4 of this report.

Studies to be carried out (2024):

The preliminary project footprint of the separation plant in Sept-Îles overlaps drainage sections of the Au Foin River. Therefore, the FAFH assessment will include the tributary as a whole, from its confluence at the Bay of Sept-Îles to the head of the river. The total watershed is of 562 m² (OBV Duplessis, 2021).

Spawning investigations are planned in May-June 2024 to clearly delineate the spawning grounds of the rainbow smelt in the Au Foin River. For the American eel, specific summer fishing campaign (night surveys at restrictive flow sections, electrofishing, eel fyke nets) will be performed along with FAFH characterization surveys. Brook trout could also be using the downstream reach of the Au Foin River. Nonlethal gears (fyke nets, minnow traps) will be preferred for the fish community surveys. To account for the tide effect, the use of a seine at the mouth of the river will provide information on small species and on juveniles (downward to low tide).

Invasive aquatic species (Northern & Sept-Îles components)

The presence and/or consideration of invasive aquatic species is documented for the biological environment. The characterization of the aquatic environment shall include consideration of invasive species. For all habitats (terrestrial, wetland, riverine, aquatics and marine), if invasive species are encountered, positioning and delineation will be taken for appropriate consideration.

The ESIA will include specific measures to prevent, control, manage and adequately monitor these undesirable species.

14.2.3 Amphibians and Reptiles

14.2.3.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

No amphibians or reptiles were observed or heard in and around the project study area during the various field surveys conducted in 2011, 2012, and 2013. However, the mink frog and wood frog may be present within the study area at this latitude.

Studies to be carried out:

The dataset for amphibians and reptiles is most likely still accurate given the absence of any human activities. Therefore, no new field inventories are planned at the mine site, but any incidental observations of species at risk will be compiled as part of the data and incorporated into the study results. The terrestrial environment work plan will be to update the documentation on these environments.

In order to obtain a current picture of the amphibians and reptiles components present at the mine site and road corridor, all available and relevant databases will be consulted in order to update the existing information. The following databases will be consulted:

- CDPNQ,
- Canadian Wildlife Service (CWS) databases,
- COSEWIC,
- Government website Fisheries, Forestry and Agriculture, Province of Newfoundland and Labrador
- Atlantic Canada Conservation Data Centre (AC CDC),
- Nature Counts web portal
- List of species at risk in Canada
- List of wildlife species designated as threatened or vulnerable or likely to be so in Quebec

14.2.3.2 Separation Plant (Sept-Îles project component)

The separation plant insertion area overlaps the range of 11 species of amphibians or reptiles occurs in the proposed separation plant area (Table 14-16). None of them are species at risk federally or provincially.

Table 14-16: Amphibians or reptiles potentially present in the insertion area

Common name
Eastern Newt
Blue-spotted Salamander
Two-lined Salamander
Redback Salamander
American Toad
Spring Peeper
Wood Frog
Leopard Frog
Green Frog
Mink Frog
Common Gartersnake

Studies to be performed:

Amphibians and reptiles surveys at the separation plant will be carried out within the study area. The proposed methodology will follow the current standardized protocols the MELCCFP. A literature review will also be carried out.

14.2.4 Avian Fauna

14.2.4.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

Birds surveys were carried out in 2011 and 2012. Additional surveys were carried out in 2023 at the mine site and along option A of the access road. A second year of data collection will take place in 2024 for the mine site and a first year of survey for option C of the access road. The second year of data collection for the access road will take place in 2025 on the chosen option. The 2023 data has yet to be analysed since a second year of data will be collected, hence the results described in the following sections are the results of the 2011 and 2012 surveys. The results of the surveys will be incorporated in the baseline report for the environmental assessment.

14.2.4.1.1 Waterfowl and Seabirds

A total of 208 individuals and 77 indicated breeding pairs from 11 waterfowl species (1 species of goose, 2 species of dabbling duck and 9 species of diving duck) and one loon species were observed at the mine site during the first 2011 aerial breeding pair survey. During the second aerial survey, carried out five or six days later, a total of 173 ducks and geese were observed. This number included 73 indicated pairs. The relative abundance of the various species was the same as for the first aerial survey, with the exception of the hooded merganser, which was not seen again during the second aerial survey, and the common goldeneye, which was not seen during the first aerial survey.

The size of the groups observed ranged from 1 to 17 individuals [primarily one (35%) or two (39%)], for an average of 2.4 individuals per observation. A total of 10 species considered to be breeding was surveyed in the study area, including 90 breeding pairs. On average, 44.5 to 44.8 indicated pairs were observed per 100 km^2. Expressed in linear kilometres of shoreline, the average waterfowl density ranged from 4.2 to 4.6 individuals, or 1.7 to 1.8 breeding pairs per 10 km of shoreline, regardless of the species, during the first and second surveys, respectively.

The species with the highest number of individuals was the Canada goose with 27 indicated pairs. This species made up 47% and 42% of the total numbers during the first and second aerial surveys, respectively, and was followed in abundance by the green-winged teal with 14 indicated pairs (second aerial survey), the long-tailed duck with 11 indicated pairs (first aerial survey), the red-breasted merganser, also with 11 indicated pairs (second aerial survey) and the northern pintail with 9 indicated pairs (first aerial survey).

During the waterfowl aerial survey in the road corridor, a total of 169 individuals and 86.5 indicated breeding pairs from 12 waterfowl species (1 species of goose, 3 species of dabbling duck, and 8 species of diving duck) and one loon species were observed.

The size of the groups observed ranged from 1 to 4 birds, for an average of 1.9 per observation. A total of 11 species considered to be breeding were found in the study area, including 87.5 breeding pairs. On average, 40.8 indicated pairs were observed per 100 km^2. Expressed in linear kilometres of shoreline, the average waterfowl density ranged from 2.9 individuals, or 1.5 breeding pairs per 10 km of shoreline, regardless of the species, during waterfowl aerial survey.

Studies to be carried out:

Method

Target species include all species of waterfowl (anseriformes), as well as other waterfowl species (e.g. loons, shorebirds, gulls, etc.).

Aerial surveys will be carried out by helicopter. The crew will consist of a pilot, a navigator-observer seated to his left, an observer seated behind the pilot and a note-taker-observer seated behind the navigator-observer.

The crew will conduct a visual count (direct count) of all birds observed while flying over the shores of lakes, ponds, wetlands and streams. Aerial surveys will be carried out at an altitude of 50 m and a speed of 100 km/h.

The widest sections of some water bodies will be covered one shore at a time, while the narrowest sections will be covered from the middle of the water body. An aerial survey will also be carried out on the shores of all islands located in lakes and water bodies. Where surfaces are still frozen, only the unfrozen areas will be surveyed.

The overflights will take place in June. Counts will be carried out during the day, taking into account the studies of Bordage (1985) who observed that in the north, no time of day was significantly more favourable than another for counting ducks.

Data collection

The navigator-observer seated at the front will be responsible for navigation, detecting and identifying birds, and positioning observations on a 1:40,000 scale map.

The observer seated behind the pilot will monitor his side of the helicopter and take photos. The observer-note-taker seated behind the observer-navigator will be responsible for detecting birds missed by the observer-navigator, taking the GPS position of all sightings and sending the sighting number to the observer-navigator, as well as transcribing the data from the other crew members onto the survey forms.

Information collected will include: date, aerial survey number, team members, weather data, observation conditions, duration of survey and start and end times, GPS position number, species present, number of individuals, sex of individuals, behavior of individuals (posed, perched, in flight), and habitats where they were found (body of water, river or stream, bog, terrestrial). At the end of each field day, the forms will be reviewed and the GPS points, itineraries and digital photographs will be downloaded onto a laptop. In addition, files will be backed up daily and stored on a USB stick.

14.2.4.1.2 Raptors

During the 2011 surveys, six species of raptors were observed around the mine site. During the first aerial waterfowl survey in June 2011, 18 individuals from four different species were observed. A total of three raptors were observed during the second aerial waterfowl survey. In addition, 22 individuals from four different species were seen during the caribou surveys. The rough-legged hawk was the most abundant species, with 27 individuals and eight nests, followed by the peregrine falcon, with seven individuals observed near four nests. The golden eagle, short-eared owl and bald eagle were observed on a few occasions, while the osprey was seen only once. Three of the above species were confirmed breeders: the golden eagle, the rough-legged hawk, and the peregrine falcon. The other species are possible breeders.

During the 2012 survey in the road corridor, 18 individuals belonging to five different species were observed in the 4 km buffer zone on either side of the road options. The peregrine falcon was the most numerous with seven individuals, followed by the golden eagle with six sightings, the merlin with two, the gyrfalcon with one sighting, and one short-eared owl. Another raptor, an eagle, was seen too briefly to allow proper identification. In addition, a total of three active nests were found in the road corridor study area, all of which were peregrine falcon nests. Twenty-seven old and unidentified raptors nests were also observed.

Studies to be carried out:

Method

The raptor survey will be carried out at the same time as the waterfowl survey, i.e. in June. The counting technique will be to directly count and describe each individual and each nest observed. During the surveys, all raptor sightings will be recorded and plotted on 1:50,000 scale maps. GPS positions will also be recorded. The shores of lakes and rivers in the waterfowl study area, as well as all outstanding cliffs in the study zone (5 km perimeter around the project), will be closely examined to locate raptor nests. Cliffs over 8 m high will be identified beforehand and plotted on 1:50,000 scale maps. Aerial surveys will be carried out using a helicopter.

Data collection

During the surveys, the helicopter will fly parallel to the cliff face, separated from it by a distance of about 50 m. The number of passes will depend on the height of the cliff: the first pass will start a few metres below the top of the cliff, and the other passes will be made progressively lower. Observers will scan the cliffs for nests. The search will be based on clues to the presence or use of a nest, such as droppings, feathers, one or more adults flying off the cliff, prey remains and ochre-coloured nitrophilous lichen. Digital photographs will systematically be taken to illustrate the habitats used.

For each raptor sighting, the following information will be recorded by the navigator: species, GPS point number, number of individuals and type of activity (e.g. moving, resting, feeding, brooding, defending territory). For each nest, the navigator will note the type of support, nest contents (number of eggs and chicks), nest orientation, condition, size, presence and length of overhang and presence of nitrophilous lichen. The navigator will also determine the nest's altitude using the helicopter's altimeter. A nest will be considered unoccupied for the current year when no sign of occupation is observed. Conversely, the nest will be considered occupied when a pair is seen on or near the nest, or when signs of reproduction or a freshly decorated nest are observed.

14.2.4.1.3 Passerines, Game Birds and Shorebirds

Two methods are used for bird surveys by point counts: 1) the radius circular plot (LRC method) and 2) the undetermined distance index (UDI) method. The LRC method involves counting, from a fixed point, all birds seen or heard within a 50 m radius circular plot for two consecutive 5-minute periods (10 minutes in all). The 50 m radius covers an area large enough to allow detection of the most inconspicuous species, while remaining within the auditory and visual detection range of most bird species. Plot boundaries will be determined using visual reference points located 50 m from the point-count site. The UDI method differs from the LRC method in that there is no limitation on sampling distance. The advantage of the UDI technique is that it covers a larger area than the LRC method, which generally makes it possible to study species with a larger territory or less common species. The UDI method will be used in conjunction with the LRC method.

Before realising the survey, the point count will be preceded by a pause of at least 5 minutes after the arrival of the observer, to mitigate the effect of the observer on bird activity. During this break, the observer will describe the habitats present within the 50 m radius covered by the LRC. Vegetation cover, the number of vertical vegetation strata, visibility and the presence of fallen woody debris will be noted. During the count, two birds of the same species will be considered as two distinct individuals when they are seen or heard simultaneously, when they call to each other or when they can be differentiated on the basis of morphological characteristics.

A total of 20 species were detected during the point count survey at the mine site. Of these, 18 were detected using the limited radius count method, and two additional species were detected beyond the 50 m of the point counts using the undetermined distance index method. Most of the species detected consisted of passerines (14 species) However, five shorebird species and the willow ptarmigan were also heard or observed during the survey. In addition, a pair of lesser yellowlegs, some spotted sandpipers and a few dark-eyed juncos were heard after the 10-minute survey period.

The average density established by the LRC data was 5.97 breeding pairs per hectare. The most abundant species were the Lapland longspur (1.67 pairs per hectare), the American tree sparrow (0.79 pairs per hectare), the American pipit (0.66 pairs per hectare) and the horned lark (0.57 pairs per hectare). Lapland longspurs were often observed in the June 2011 surveys, and nests were also found in scrubland alongside Lake Brisson. Two other species (Semipalmated Plover and Common raven), were detected outside the 50 m radius from each point count. In addition to being the most abundant species, the Lapland longspur was also the species with the most constancy, that is, the one heard or observed most frequently (21 of the 29 study area point counts). The average Shannon Diversity Index is 1.06 for the mine site based on the survey results collected.

For the road corridor, in order to compare bird communities from different vegetation cover types, each point count surveyed on the Western Plateau, Central Ranges and in the Ikadlivik Brook valley was assigned to a vegetation class type. For the Ikadlivik Brook valley point counts the original cover units defined and the stratified sampling plan were used. For the western portion of the road corridor in which point count locations were selected systematically, the underlying vegetation cover type was first assigned, but checked and reclassified to fit field data recorded during the point count surveys. In order to obtain meaningful statistics, vegetation cover types was regrouped in three classes that shared structural and plant cover characteristics. The following classes were selected and each point count was than assigned to one of the three classes:

- ecotones and deciduous forests: wetlands, shrublands, mixed-deciduous forest, and deciduous forest;
- heaths: rocky heaths, shrub and herbaceous heaths, mixed heaths;
- coniferous forests: mixed forest in which spruce (Picea spp.) dominates, closed resinous, lichen-resinous, and open resinous.

Richness, diversity indices and bird densities were calculated for each class. Point counts that fell into coniferous forests or similar habitat types had a greater bird Shannon diversity index and density compared to ecotone/deciduous and heaths habitats. The average density established by the LRC data was 4.38 breeding pairs/ha, and the average Shannon Diversity Index for the coniferous point counts is 0.86, both parameters being about two times higher than those obtained in ecotone and heath habitats. Actually, the average density significantly differed between habitats ($p = 0.038$) and was significantly higher in conifer habitats than in ecotone habitats ($p = 0.039$), but there were no statistical difference between conifer habitats and heath habitats ($p = 0.082$).

Ecotone and Deciduous Forests

A total of 17 species were detected during the point count survey. Of these, 9 breeding species were detected using the limited radius count (LRC) method, and 8 additional species were detected beyond the 50 m of the point counts using the undetermined distance index (UDI) method. An average of 1.30 species was detected within each 50 m radius circular plot (LRC method) and this average was 5.10 species per point count with the UDI method. The average density established by the LRC data was 1.78 breeding pairs/ha, the lowest values among the three habitat types analyzed. The average Shannon diversity index for this habitat class is 0.39, the same value obtained for heath habitats.

The most abundant breeding species according to the LRC method were the dark-eyed junco (0.38 pairs per hectare), the Swainson's thrush (0.25 pairs per hectare), the grey jay (0.25 pairs per hectare), and the pine siskin (0.25 pairs per hectare). In addition to being the most abundant breeding species, the dark-eyed junco was also the species with the most constancy i.e. the one heard or observed most frequently (3 of the 10 ecotone point counts). Otherwise, the pine siskin, which was one of the most abundant species in ecotone habitat, was absent in the point count carried out in heath and conifer habitats. Also, although not the most abundant breeding species within the 50 m radius circular plot (LRC method), the common redpoll was by far the most numerous species detected by the UDI method (2.60 pairs per point count).

Heaths

A total of 17 species were detected during the point count survey. Of these, 10 breeding species were detected using LRC method, and 7 additional species were detected beyond the 50 m of the point counts using the UDI method. An average of 1.50 species was detected within each 50 m radius circular plot (LRC method), and this average was 4.44 species per point count with the UDI method. The average density established by the LRC data was 2.19 breeding pairs per hectare, which was slightly higher than what was observed in the ecotone/deciduous forest habitat. The average Shannon diversity index for the heath point counts is 0.39, similar to the value obtained for the ecotone and deciduous forests.

The most abundant breeding species according to the LRC method were the horned lark (0.42 pairs per hectare), the common redpoll (0.35 pairs per hectare), the American pipit (0.35 pairs per hectare), the white-crowned sparrow (0.28 pairs per hectare) and the savannah sparrow (0.28 pairs per hectare). In addition to being the most abundant breeding species, the horned lark was also one of the two species (American Pipit was the other) with the most constancy (5 of the 18 heath point counts). These two species were also unique to the heath habitat since no individual was observed in the ecotone and conifer point counts. According to the UDI method, the common redpoll was the most abundant species detected in heath habitats (2.50 pairs per point count).

Coniferous Forests

A total of 16 species were detected in this habitat class. Of these, 15 breeding species were detected using the LRC method, and 1 additional species was detected beyond the 50 m radius of the point counts using the UDI method. An average of 2.75 species was detected within each 50 m radius circular plot (LRC method), whereas the average was 5.94 species per point count with the UDI method. In the Voisey’s Bay region, the average density of birds (breeding pairs of migratory and resident species plus individuals of nomadic resident species) observed in 1996 in 4 experimental plots was 4.54 per ha (JWEL, 1997c). This density was established in spruce-fir/dwarf shrub habitats using the territory mapping method that included nomadic and gregarious resident species (pine grosbeak, white-winged crossbill and common redpoll). If these species are excluded from computations, the breeding density obtained was 1.90 pairs/ha for JWEL (1997c) and 2.86 breeding pairs/ha for our study. However, differences might be due to different survey methods.

The most abundant breeding species according to the LRC method were the common redpoll (0.72 pair/ha), the white-winged crossbill (0.64 pair/ha), the American robin (0.48 pair/ha), the yellow-rumped Warbler (0.48 pair/ha), and the grey Jay (0.48 pair/ha). In addition to being the second most abundant breeding species, the white-winged crossbill was also the species with the highest constancy (6 out of 16 point counts). This species was also highly associated with conifer habitats since none was present within the 50 m radius circular plot (LRC method) in the two other habitat types. With the UDI method, it was also the common redpoll that was the most numerous species detected in coniferous habitat (4.31 pairs per point count). In the spruce-fir/dwarf shrub habitat of the Voisey's Bay region, the most numerous species were the same as in the present study, namely the common redpoll, the yellow-rumped warbler, the white-winged crossbill and the dark-eyed junco (JWEL, 1997c).

Studies to be carried out:

Literature review

Data collection for the avifauna component involves consulting all relevant databases. The following databases, as well as any scientific articles or other relevant references, will be consulted:

- Atlas des Oiseaux nicheurs du Québec,
- CDPNQ,
- eBird,
- Canadian Wildlife Service (CWS) databases,
- Quebec and Newfoundland and Labrador databases,
- COSEWIC,
- MELCCFP,
- Government website Fisheries, Forestry and Agriculture, Province of Newfoundland and Labrador
- Atlantic Canada Conservation Data Centre (AC CDC),
- Nature Counts web portal
- List of species at risk in Canada
- List of wildlife species designated as threatened or vulnerable or likely to be so in Quebec
- Strange Lake B-Zone. Biological Environment Baseline Surveys. Semi-aquatic and Terrestrial Wildlife - 2011-2013.
- Quest Rare Minerals Ltd. Final Report. September 2015.

Field Surveys

The songbird inventory includes counts of passerines, woodpeckers, grouse and shorebirds. Should other species be detected during these surveys, they will also be counted and recorded, but will not be included in the songbird analysis.

Songbird species diversity and abundance will be documented by point counts using transect sampling for the road corridor. For the mine site, a 2 km grid will be superimposed on the previously defined study area map. All grid intersection points located within or near the mine site study area will be sampled. If any points are located in waterbodies, they will potentially be removed. In order to adequately sample the different vegetation strata at the mine site, a listening station will be added in the wooded area along Brisson Lake, near the camp.

Data collection

Point counts will be carried out during the month of June. The songbird survey will thus be timed to coincide as closely as possible with the territorial behaviour of most passerines.

The point count survey method is based on CWS guidelines. Efforts will be made to carry out point counts in suitable weather conditions (i.e. temperatures between 0 and 14 °C, with no precipitation and winds of less than 10 knots) to increase the probability of detecting birds. Surveys will be carried out between 5:00 and 10:30 a.m., when birds are most active (Robbins, 1981). Two teams will be required for the surveys, each consisting of a bird song specialist and a second person to ensure safety during the work.

Point counts will combine two different methods to optimize the time allocated to field surveys. The first method is a Limited Radius Count (LRC; Bibby et al., 1992), while the second is an Unlimited Distance Index (UDI; Blondel et al., 1981).

The LRC method involves counting, from a fixed point, all birds seen or heard within a 50 m radius circular plot for two consecutive 5-minute periods (10 minutes in all). The 50 m radius covers an area large enough to allow detection of the most inconspicuous species, while remaining within the auditory and visual detection range of most bird species. Plot boundaries will be determined using visual reference points located 50 m from the point count site.

The UDI method differs from the LRC method in that there is no limitation on sampling distance. The advantage of the UDI technique is that it covers a larger area than the LRC method, which generally makes it possible to study species with a larger territory or less common species. The UDI method will be used in conjunction with the LRC method.

The survey will be preceded by a pause of at least 5 minutes after the arrival of the helicopter observer, to mitigate the effect of the helicopter on bird activity. During this break, the observer will describe the habitats present within the 50 m radius covered by the LRC. Vegetation cover, the number of vertical vegetation strata, visibility and the presence of fallen woody debris will be noted. During the count, two birds of the same species will be considered as two distinct individuals when they are seen or heard simultaneously, when they call to each other or when they can be differentiated on the basis of morphological characteristics.

The results will be converted into the number of pair-equivalents according to information from the Atlas des oiseaux nicheurs du Québec (2011): an individual singing or emitting an alarm call, an occupied nest or a family have been considered to represent a pair; only a silent individual outside its breeding habitat will not be considered a pair-equivalent.

14.2.4.2 Separation PLant (Sept-Îles project component)

Avian communities found in terrestrial habitats in the vicinity of Sept-Îles are typical of the boreal forest ecosystems. These habitats are the breeding grounds of many groups of migratory and resident birds' species such as woodpeckers, thrushes, warblers, sparrows, crossbills and birds of prey. Wetlands and aquatic habitats are also abundant in the landscape, and they provide staging and breeding habitats for numerous ducks, geese, loons, shorebirds and gulls species. Commonly seen species are black duck, common goldeneye, common merganser, green-winged teal, Canada goose, spotted sandpiper and herring gull.

More details on migratory and marine bird species occurring in the Bay of Sept-Îles and Archipelago are presented in Section 14.3.4.1.5 of this report.

Studies to be carried out:

Literature review

Data collection for the avifauna component involves consulting all relevant databases. The following databases, as well as any scientific articles or other relevant references, will be consulted:

- Atlas des Oiseaux nicheurs du Québec;
- CDPNQ;
- eBird;
- Canadian Wildlife Service (CWS) databases;
- COSEWIC;
- MELCCFP;
- Nature Counts web portal;
- List of species at risk in Canada;
- List of wildlife species designated as threatened or vulnerable or likely to be so in Quebec.

Field Surveys

The songbird inventory includes counts of passerines, woodpeckers, grouse and shorebirds. Should other species be detected during these surveys, they will also be counted and recorded, but will not be included in the analysis.

Songbird species diversity and abundance will be documented by point counts using transect sampling for the road corridor. For the separation plant, a 2 km grid will be superimposed on the previously defined study area map. All grid intersection points located within or near the mine site study area will be sampled. If any points are located in waterbodies, they will potentially be removed.

Data collection

Point counts will be carried out between mid-May and mid-June. The songbird survey will thus be timed to coincide as closely as possible with the territorial behaviour of most passerines.

The point count survey method is based on CWS guidelines. Efforts will be made to carry out point counts in suitable weather conditions (i.e. temperatures between 0 and 14 °C, with no precipitation and winds of less than 10 knots) to increase the probability of detecting birds. Surveys will be carried out between 5:00 and 10:30 a.m., when birds are most active (Robbins, 1981).

Point counts will combine the same two different methods, LRC and UDI, as described above to optimize the time allocated to field surveys.

The results will be converted into the number of pair-equivalents according to information from the Atlas des oiseaux nicheurs du Québec (2011): an individual singing or emitting an alarm call, an occupied nest or a family have been considered to represent a pair; only a silent individual outside its breeding habitat will not be considered a pair-equivalent.

14.2.5 Mammals

14.2.5.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

During a survey of snow tracks around the mine site in 2012, tracks of seven different animal species were observed, primarily in wooded areas. Arctic fox and red fox tracks were most frequently observed in the plots.

Five species were identified during a survey of micromammals: the deer mouse, the meadow vole, the eastern heather vole, the Gapper's red-backed vole and the masked shrew. These are common species in northern Quebec and Labrador.

During summer, the most frequently observed mammals were black bear, arctic fox, red fox, arctic hare, red squirrel, and gray wolf.

14.2.5.1.1 Caribou

Historical observations of migratory caribou herds of Quebec and Labrador have undergone significant demographic changes. A first detectable population peak occurred between 1870 and 1890, based on a consensus between historical reviews and an index developed to estimate the population size of the George River Caribou Herd. This population peak was followed by 3 crashes resulting in a record low in 1956 (Table 14-17). The population then began to recover gradually and reached record high numbers again in the 90's. However, the population has been experiencing a rapid decline in recent years (Bergerud *et al.*, 2008).

The George River caribou population is the only known caribou herd using the project area. Data on this herd have been gathered by Quebec and Labrador wildlife managers, as well by universities, since the early 1970s. The Quebec and Labrador governments have been monitoring the migratory tundra caribou herd's seasonal movements for at least the last 30 years by means of radio collars fitted individuals.

Table 14-17: George River Caribou Herd Demographic Changes

Year	Estimated Number of Caribou	Reference
1956	5,000	Bergerud *et al.*, 2008
1993	776,000	Couturier *et al.*, 1996
2001	385,000	Couturier *et al.*, 2004
2010	74,000	MRNF, 2010
2012	27,600	MRNF, 2012
2014	14,200	Gouv. Qc, 2014

Using telemetry data available from the MELCCFP (formerly MERN, MRNF and MFFP) from 2000 to 2012, the southern limit of the traditional calving grounds of the George River herd was located at least 40 km north of B-Zone. The same data indicate that a small proportion (4.3%) of tagged caribou were located within 30 km of the project area. During the annual migration cycle, September and October are the months when the greatest number of marked caribou moved near the project area during their fall migration to reach winter habitats located to the south and east.

This data will be updated with telemetry data available for the years following 2012.

During the June 2011 aerial surveys at the mine site, a total of 62 caribou groups were observed, for a total of 480 individuals. The individuals observed included 392 adults (82%) and 88 yearlings (one year-old juveniles) (18%), for an average of 1.4 juveniles per group. No newborn calves were observed within the mine site or a 20 km buffer zone surveyed.

At the time of the aerial surveys, a single caribou group was observed in the immediate project area. This group was composed of 16 adults, including eight males and two females and six undetermined. All other groups were in the 20 km buffer zone surveyed around the mine site. The average number of caribou per group was 7.7 ± 1.3 (confidence interval of 95%).

In addition to the aerial survey, two groups of three and four caribou were seen near the exploration camp or at about 5 km southwest of the exploration camp. Three bulls formed the group of three and the group of four was composed of one bull and at least 2 cows.

During the October 2012 aerial surveys along the road corridor, a total of five caribou groups were observed in the study area, for a total of 266 individuals. The individuals observed included 260 adults (98%), one yearling (one year-old juvenile) (0.3%), and five calves (1.9%) for an average of 1 calf per group. The number of caribou per group varied between 11 and 174 for an average of 53.2. Among caribou for which the sex could be determined, females counted for 65% (n = 102) and males 35% (n = 54).

Map 14-5 presents the caribou protection areas and historical caribou ranges.

Studies to be carried out:

Literature review

Data collection for the caribou component involves consultation of all relevant databases. The following databases, as well as any scientific articles or other relevant references, will be consulted:

- CDPNQ
- Canadian Wildilfe Service (CWS) data,
- Quebec and Newfoundland-Labrador government data,
- COSEWIC/COSEPAC,
- MRNF monitoring data
- Atlantic Canada Conservation Data Centre (AC CDC)
- Nature Counts web portal
- Newfoundland and Labrador Fisheries, Forestry and Agriculture government website
- List of species at risk in Canada
- Liste des espèces fauniques désignées menacées ou vulnérables ou susceptibles de l'être du Québec (in French only)
- Strange Lake B-Zone. Biological Environment Baseline Surveys. Semi-aquatic and Terrestrial Wildlife - 2011-2013. Quest Rare Minerals Ltd. Final Report. September 2015.

Traditional Knowledge from the different Indigenous communities will continue be taken into consideration. Caribou working groups will be created with different Indigenous communities to share data, coordinate surveys and plan mitigation measures and protection plans.

Field Surveys

Torngat Metals cancelled the field caribou field surveys that were planned in 2023 following a request from the Caribou Working Group that was set up in collaboration with the Naskapi Nation of Kawawachikamach (see Section 4.1.1). This measure aims to avoid disturbance of the herd. Analysis will rather be conducted with the existing telemetry data.

Telemetry data from George River caribou fitted with radio collars have been obtained from the MELCCFP in Quebec, and should be obtained by other governments for the sole use of this baseline study. The request was specifically for data gathered from 2000 to 2022 and covering a 100 km area around the mining site, and along a 100 km strip on either side of the road corridor to the Nain region along coastal Labrador. Every recording specifies the radio-tagged individual's number, sex, recording date and time, as well as the X and Y coordinates for each reading. The collars transmit the position of individual animals every five days through the Argos satellite system and have an accuracy of 150 m.

To map distributions and most used crossing areas, analyses will be performed using the density function from the Spatial Analyst Extension of ArcGIS to identify potential crossings and movements between two subsequent recordings within the proposed road corridor. The model parameters include a search radius of 3 km.

14.2.5.1.2 Chiropterans (bats)

A field survey was conducted early summer 2023 but the acoustic data have not yet been processed at the time of producing this document.

Studies to be conducted:

Literature review

Data collection for the bats component involves consulting all relevant databases. The following databases, as well as any scientific articles or other relevant references, will be consulted:

- CDPNQ
- Canadian Wildilfe Service (CWS) data,
- Quebec and Newfoundland-Labrador government data,
- COSEWIC/COSEPAC,
- MRNF
- Atlantic Canada Conservation Data Centre (AC CDC)
- Nature Counts web portal
- Newfoundland and Labrador Fisheries, Forestry and Agriculture government website
- List of species at risk in Canada
- Liste des espèces fauniques désignées menacées ou vulnérables ou susceptibles de l'être du Québec (in French only)
- Strange Lake B-Zone. Biological Environment Baseline Surveys. Semi-aquatic and Terrestrial Wildlife - 2011-2013. Quest Rare Minerals Ltd. Final Report. September 2015.

Field Surveys

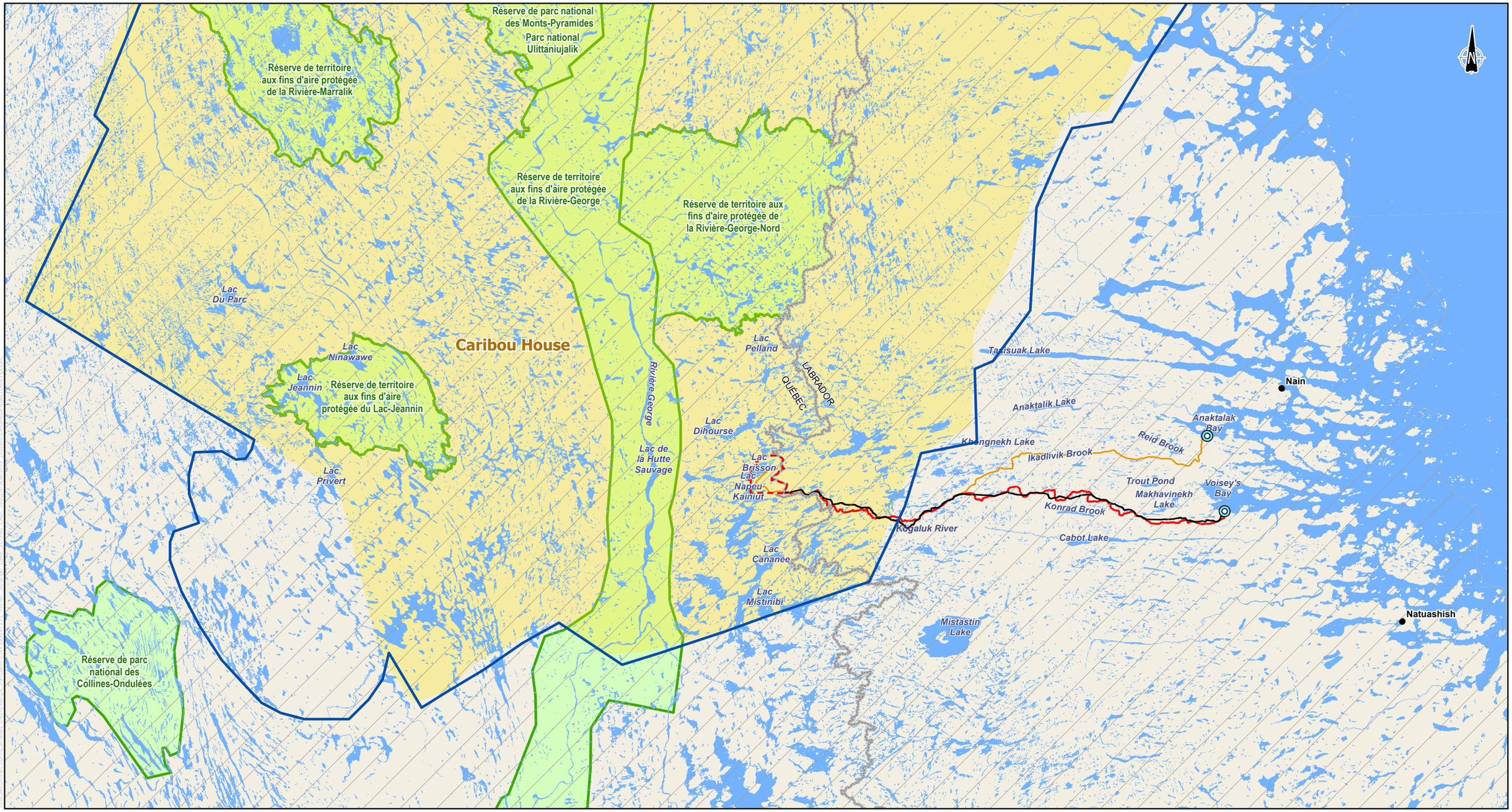
Despite the absence of trees in the mine area, acoustic surveys for chiropterans will be sampled throughout the sites of northern components of the project.

The *Recueil des protocoles standardisés d'inventaires acoustiques de chauves-souris au Québec* (MFFP, August 2022) will be used to conduct bat surveys.

No other specific surveys will be carried out for other wildlife, but any incidental observations will be noted and included in the survey results.

MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT



Composantes du projet / Project Components

- Limite des concessions d'exploration minières détenues par Métaux Torngat / Outline of Torngat Metals Mineral Exploration Claims
- Site potentiel des installations portuaires / Potential site for Port Facilities

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Caribou / Caribou

- Caribou House
- Aire de mise bas historique du caribou de la rivière George / George River Caribou Historical Calving Grounds
- Habitat historique du caribou de la rivière George / George River Caribou Historical Home Range

Autre / Other

- Aire protégée / Protected area
- Frontière Québec et Labrador / Quebec and Labrador border

1:1 100 000

0 10 20 km

NAD 1983 UTM Zone 20N

Source:
Données topographiques / Topographic data: RNCan (2022)
Aire protégée / Protected Area: MELCC (2023)
Caribou House: https://nunatukavut.ca/site/uploads/2019/05/upcart-strategy-2017-11-07-eng-signed-sm.pdf, SNAP (2017)
Aire d'habitat et de mise bas historique du caribou de la rivière George / Calving and Home Ranges of the George River Caribou: Newfoundland and Labrador Government (2023)

Carte 14-5
Aires de protection du Caribou

Map 14-5
Caribou Protection Areas

AECOM

14.2.5.2 Separation Plant (Sept-Îles project component)

Large mammals such as moose and black bears are common and can be found in all habitats in the area particularly in young stands or early successional forests. Many furbearer species such as the beaver, the gray wolf, the red fox, the American marten, the ermine, the river otter, the muskrat, and the striped skunk also occupy the area. Red squirrels and various species of voles and other microtine rodents are also highly present and sometimes abundant in many habitats found in this region.

Studies to be conducted:

The *Recueil des protocoles standardisés d'inventaires acoustiques de chauves-souris au Québec* (MFFP, August 2022) will be used to conduct bat surveys.

No other specific mammal field surveys are currently planned in Sept-Îles, but any incidental observations will be noted and included in the survey results.

14.2.6 Terrestrial Species at Risk

14.2.6.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The following text presents the conservation status for sensitive species observed during the 2011, 2012 and 2013 surveys:

- The Harlequin duck is listed as a species of special concern in Canada and is considered vulnerable under the legislation of Quebec and Newfoundland and Labrador.
- All raptor species observed, with the exception of the osprey and the rough-legged hawk, have conservation status under provincial or federal legislation.
  - Golden eagle: no federal status but considered vulnerable in Quebec
  - Peregrine falcon: no federal status but vulnerable in Quebec and in Newfoundland and Labrador
  - Bald eagle: no federal status but considered vulnerable in Quebec
  - Short-eared owl: federally special concern, vulnerable in Newfoundland and Labrador and likely to be designated threatened or vulnerable in Quebec. It should be noted that it is currently under review to change its status. It is considered threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).
- Caribou are an important issue given the value of this animal to Indigenous and non-Indigenous people in Quebec and Newfoundland and Labrador, and the recent decline in the George River migratory herd population (from 74,000 in 2010 to 14,200 in 2014). Regardless, this population does not have legal conservation status. COSEWIC, for one, considers it endangered and it is currently under review for addition to the SARA schedule. This migratory population is not listed as threatened or vulnerable in Quebec or in Newfoundland and Labrador.
- No other wildlife or plant species with conservation status were observed during the 2011, 2012 and 2013 surveys.

Studies to be conducted:

In order to obtain the most up-to-date information on the conservation status of species present or potentially present in the study areas, a literature review will be carried out prior to the field inventories. The review will update the conservation status of the various species at risk previously identified in the study areas, to add rare or species at risk or their habitats to the list of species potentially present, or to identify habitats favourable to the presence of some of these species. The following databases will be consulted:

- Interactive map of MELCCFP – Aires protégées au Québec (version 31 December 2023) (MELCCFP, 2023d)
- Interactive map (website) on species with precarious situation occurrences (CDPNQ, 2023)
- Canada Species at Risk List(Gouvernement du Canada, 2023b)
- COSEWIC candiate list (COSEWIC, 2023)
- Updated list of rare plant species in the northern Quebec (provided by Jessica Hawey, 17 March 2023)
- Liste des espèces floristiques désignées menacées ou vulnérables ou susceptibles de l'être du Québec (MELCCFP, 2023e)
- Liste des habitats d'espèces floristiques menacées ou vulnérables du Québec (MELCCFP, 2023c)
- Les Bryophytes rares du Québec, seconde édition (Tardif, Faubert et Lavoie, 2019)
- Canadian Wildilfe Service (CWS) data
- List of plant species at risk in the province of Newfoundland and Labrador (Government of Newfoundland & Labrador, 2023c)
- List of ecological and wilderness reserves in the province of Newfoundland and Labrador (Government of Newfoundland & Labrador, 2023a)
- COSEWIC data
- Atlantic Canada Conservation Data Centre (ACCDC)
- Web Nature Counts portal
- Government website Fisheries, Forestry and Agriculture, Province of Newfoundland and Labrador
- Strange Lake Zone B. Biological environmental baseline surveys. Semi-aquatic and terrestrial wildlife - 2011-2013. Quest Rare Minerals Ltd. Final report. (AECOM, 2015).
- 2011-2012 vegetation inventory report for Quest Rare Minerals Ltd. in the Strange Lake area, Zone B (AECOM, 2013d)

Based on the information obtained from the literature review and photo-interpretation, potential habitats for rare or endangered species will be identified. Specific surveys for rare or endangered species will then be carried out in these habitats. Habitats in which the occurrence of rare or endangered species has been recorded in the past will also be identified for specific inventories. In addition to these previously identified sites, particular attention will be paid to the presence of rare or endangered species during all inventories carried out.

Field surveys

Inventories will be carried out at a time of year when rare or endangered plant species can be identified, i.e. during their flowering period. Depending on the flowering period of the various species likely to be found in the study areas, two inventory periods may be necessary, including one at the beginning of the season for the earliest species. As a general rule, inventory periods should be between July and September for floristic species located at this latitude.

During all floristic inventories in the study areas, a report will be made of any incidental observation of a rare species or a species at risk in or near the inventory stations. When a rare or endangered species is observed, the following information will be collected:

- Species identification;
- Demographic description (isolated individual, colony, number of individuals, etc.);
- Species recovery assessment;
- Location of the individual or outline of the colony using GPS points;
- Photographs.

Particular attention will also be given to uncommon plant species during all plant inventories. If unknown species are observed, the following steps will be taken:

- Take a photo of the species;
- Collect a specimen;
- Locate the individual or colony using GPS points;
- Identification on return from the field;
- If identification still proves impossible, the specimen(s) will be sent for identification by an expert in northern plant identification;
- Validation of species status.

An active search will be carried out at specific sites for rare or endangered species. To this end, the area will be walked in search of any rare or endangered species potentially present. During these inventories, any observations of rare or endangered species or unknown species will be recorded according to the methodology explained above.

No specific wildlife surveys will be carried out for this component. Field visits will be planned only in cases where habitats or species at risk have been observed during previous inventories, but any incidental observations of species at risk will be compiled as part of the data and incorporated into the study results.

14.2.6.2 Separation Plant (Sept-Îles project component)

According to the CDPNQ, six wildlife species at risk can be found within a 8 km radius of the potential separation plant location. The Barrow's Goldeneye is vulnerable, the Yellow Rail is endangered, the Short-eared Owl, the Saltmarsh Sharp-Tailed Sparrow and the Rock Vole are likely to be designated and the Bank Sparrow is a candidate.

Studies to be conducted:

No specific survey for species at risk will be conducted. This component is covered within the other workplans described for the separation plant. However, all the potential habitats for species at risk will be surveyed.

14.2.7 Aquatic Species at Risk

14.2.7.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

In the north, for the mine site, access road and port, no aquatic fish species at risk is reported. Nevertheless, Atlantic salmon and Arctic char are both sensitive species with high significance to communities. The marine environment in the port, and along the marine transportation does involve marine mammals, and wolffish (northern, spotted). See Section 14.3 for the marine habitat, and more details on the aquatic species at risk at a broader scale.

14.2.7.2 Separation Plant (Sept-Îles project component)

For the separation Plant, the American eel is a threatened species according to COSEWIC (2012) for which large abundance are reported in the Au Foin River. Fish passage will have to be assessed from the Bay of Sept-Îles towards the separation plant. Also, plant discharge could be directed towards the Bay of Sept-Îles, after treatment.

Although already considered the largest industrial port facility infrastructure in Quebec, according to the DFO aquatic species at risk map, the presence of species at risk is nevertheless reported for one marine fish species, the spotted wolffish, and four marine mammals, the white shark and the leatherback sea turtle (DFO, 2023).

Whereas no critical habitat is reported by DFO (2023), the Bay of Sept-Îles is an important seagrass habitat for many species, and according to the MELCCFP wildlife habitat mapping, the bay is an aquatic species concentration area, as described in Section 14.3.4.1.5 of this report. The mouth of the Au Foin River being at the junction of the Aire de concentration d'oiseaux aquatiques de la Baie des Sept-Îles #4 and #5. The Réserve de territoire aux fins d'aire protégée du Marais-de-la-Baie-de-Sept-Îles is also officially mapped (See Map 14-6).

Studies to be conducted:

No specific survey for species at risk will be conducted, as this component is covered within the FAFH workplan described for the separation plant (fish passage, investigation for the American eel).

14.3 Marine Environment

The purpose of this section, Marine Environment, is to provide information on the biophysical components along the maritime route from the Labrador coast to the Separation Plant in Sept-Îles. No field surveys are planned for the existing port facilities in Sept-Îles or in Vale's Port (related to Option A of the access road).

For both Option C of the access road, a marine baseline program will begin in 2024 in order to gather up-to-date data in Voisey's Bay.

Map 14-6 exposes the proposed marine route from the eastern coast northern Labrador to the Bay of Sept-Îles.

14.3.1 Maritime Transportation from the Labrador Coast to Sept-Îles (shipping route)

The projects' proposed maritime shipping route will sail from the Labrador coast to Sept-Îles 5 to 10 times per year during the open water period only, approximately from June to October. Shipping is planned for both the construction and operation phases of the mine.

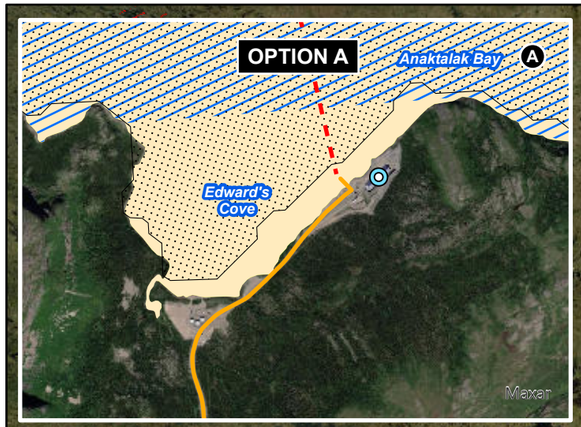
As previously discussed in this report, there are two proposed departure points linked to the two route options. Option A is the existing Port of Vale, located in Edwards Cove, in Anaktalak Bay south of Nain, Newfoundland, and Option C1 and C2 is Voisey's Bay, just south of Option A, as shown on Map 14-6. The transport vessel will follow an existing shipping route along the Labrador coast, through the Strait of Belle Isle, along the north coast of the Gulf of St. Lawrence, through the Jacques-Cartier Strait north of Anticosti Island, and finally into the Port of Sept-Îles, Quebec.

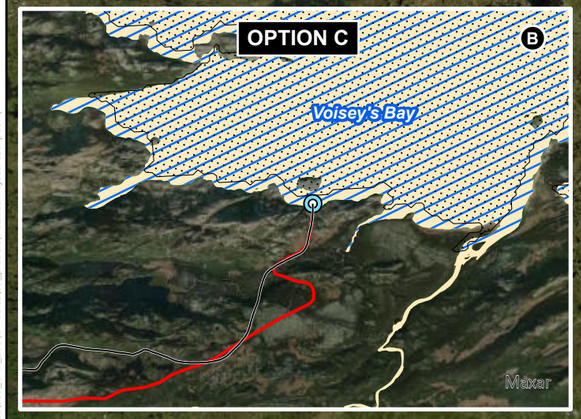
The proposed shipping route will cross two of the three ocean zones of Atlantic Canada: the Newfoundland and Labrador Shelves and the Gulf of St. Lawrence. These bioregions are determined by ocean conditions and depth. The Atlantic ecosystems are impacted by seasonal changes and two primary current systems: the cold Labrador Current from the north and the warm Gulf Stream from the south (Bernier et al., 2018; DFO, 2021). Marine ecosystems consist of the physical and chemical environment, as well as a wide range of living organisms, from plankton to whales. These ecosystems are diverse, complex, and naturally evolving. However, human activities and climate change are causing significant alterations to marine ecosystems. Climate change is the primary factor altering the Atlantic marine environment, resulting in warmer sea temperatures, reduced ice cover, rising sea levels, changes in ocean currents, and ocean acidification (Bernier et al., 2018; DFO, 2021).

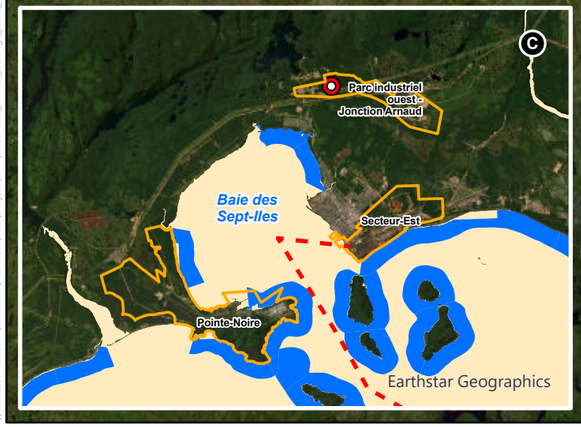
The marine environment of the Northwest Atlantic is highly productive, and includes commercially important species like Atlantic cod, snow crab, and American lobster, as well as some of the largest mammals in the world, such as the blue whale. These organisms inhabit a variety of habitats. Stretches of eelgrass habitats and kelp forests in coastal areas provide crucial food sources, shelter from predators, and nursery grounds for juvenile species. In deeper offshore waters, cold-water corals and sponges represent complex seafloor habitats that many species depend on for shelter and food. Additionally, the Northwest Atlantic serves as a significant feeding ground for migratory species, such as sea turtles, whales, and seabirds (Bernier et al., 2018; DFO, 2021).

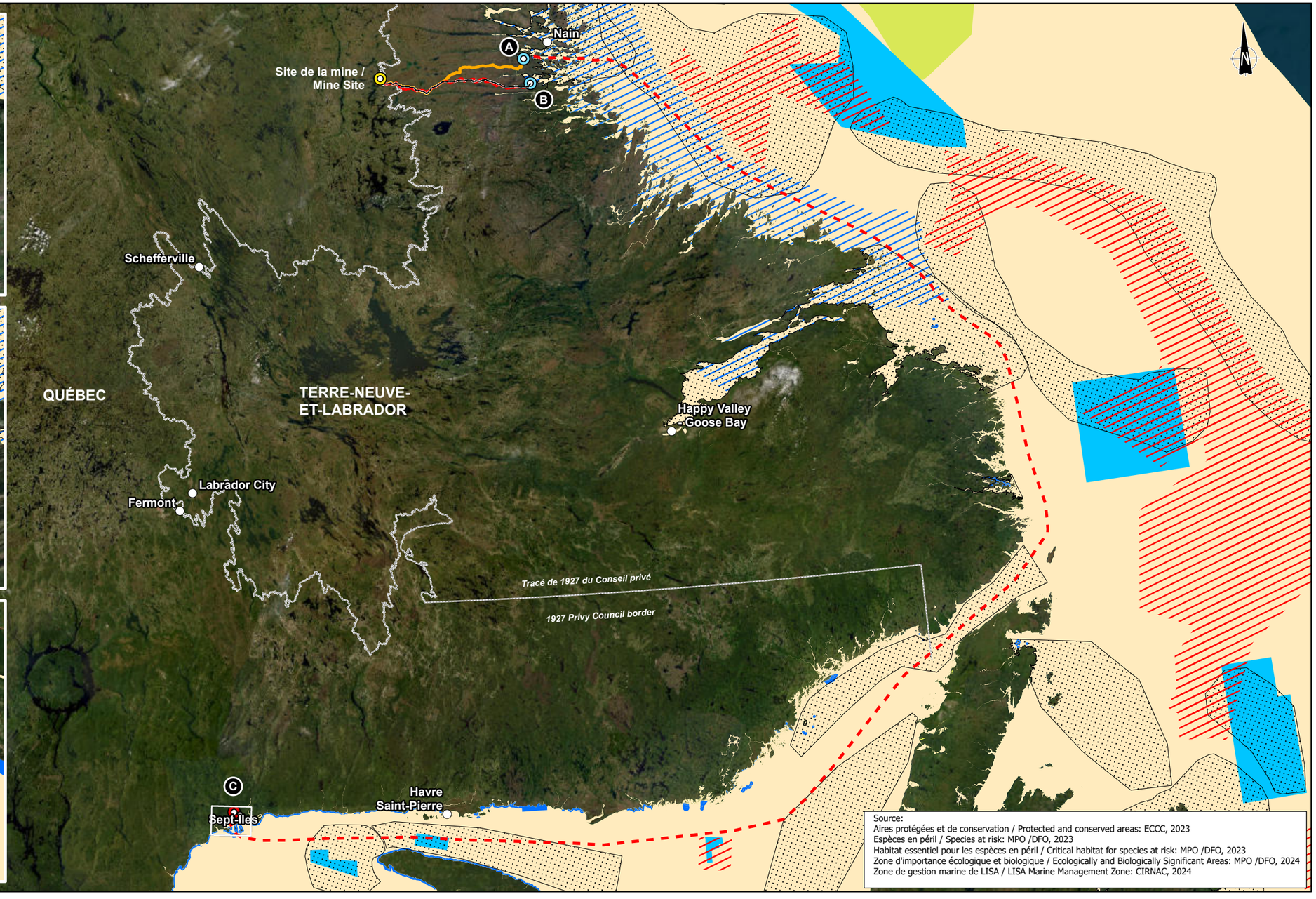
MÉTAUX TORNGAT METALS

PROJET MINIER DE TERRES RARES DU LAC STRANGE
STRANGE LAKE RARE EARTH MINING PROJECT









Composante du projet / Project Component

- Site potentiel des installations portuaires / Potential site for Port Facilities
- Mine et usine de concentration (Lac Brisson) / Mine and Concentration Plant (Lac Brisson)
- Site potentiel de l'usine de séparation des terres rares (Sept-îles) / Potential Site of the Rare Earth Separation Plant (Sept-Iles)
- Route maritime projetée / Potential Shipping Route

Route d'accès à une voie (Labrador) / Single Lane Access Road (Labrador)

- Option A
- Option C1
- Option C2

Espèce aquatique en péril / Aquatic species at risk

- Habitat essentiel pour les espèces en péril / Critical habitat for species at risk
- Autres mesures de conservation efficaces par zone marines / Marine other effective area-based conservation measure
- Aire marine protégée / Marine protected area
- Espèces menacée ou en voie de disparition / Threatened or endangered species
- Espèce préoccupante / Species with a special concern

Autre / Other

- Zone d'importance écologique et biologique / Ecologically and Biologically Significant Areas
- Zone de gestion marine de LISA / LISA Marine Management Zone
- Zone industralio-portuaire de Sept-Îles / Sept-îles industrial port area

0 50 100 km
North America Lambert Conformal Conic

Carte 14-6
Route maritime proposée

Map 14-6
Proposed Maritime Shipping Route

AECOM

\\na.aecomnet.com\Canada\EVMontreal\DCS\Projets\ENVV60697132_Mine_Strange_Lake_SL1900_CAD_SIG\Livrables\09_produit\DetailedProjectDescription\

The Northwest Atlantic is home to about 30 species of pinnipeds (seals and walruses) and cetaceans (whales, dolphins, and porpoises). During the summer, several cetacean species migrate to this region, including fin whales, humpback whales, minke whales, several species of dolphins, and the North Atlantic right whale. These seasonal species are estimated to give birth and mate in temperate and tropical zones during the winter. During their migration, these animals travel north to feed in the waters of Atlantic Canada, where their primary food sources include capelin, Atlantic herring, and northern krill. In addition, some marine mammals commonly found in the Atlantic can also be seen in the Arctic, such as the beluga, ringed seal, and Atlantic walrus. Harp and hooded seals are also migratory species that spend part of the year in the Arctic but move south to give birth and feed (Bernier et al., 2018).

The sections below provide biophysical descriptions of the environments along the ship's planned route, specifically around existing and potential port areas, and identify any species of special concern and protected habitats or areas.

14.3.1.1 Designated Areas/Zones

14.3.1.1.1 The Labrador Inuit Settlement Area (LISA)

As exposed in Section 13.5, the Labrador Inuit Settlement Area (LISA) is located within the Newfoundland and Labrador Shelf Bioregion. It is designated by the Nunatsiavut Government (NG) and includes the LISA Marine Management Zone, which is shown as blue-hatched on Map 14-6. This zone covers the proposed shipping route between Nain North and Rigolet. The Integral Marine Management Area extends from Cape Uivak in northern Labrador and extends south to the boundary of the Labrador Inuit Agreement Area. The waters south of Rigolet are excluded. The Labrador coast's tidal waters cover 48,690 km^2 (DFO, 2021). In 2017, the Nunatsiavut Government (NG) signed a Memorandum of Understanding with Environment and Climate Change Canada (ECCC) and DFO to establish a plan for the Nunatsiavut LISA Marine Management Zone (DFO, 2021). The *Imappivut* (Our Oceans) Management Plan aims to address community concerns regarding increased shipping, potential offshore oil and gas exploration, commercial and subsistence fishing, and the conservation of unique habitats. This is particularly important given the current context of climate change and retreating sea ice, which are leading to increased human activities in the region (Sevunts, 2017; DFO, 2021).

14.3.1.1.2 Ecologically and Biologically Significant Areas (EBSAs)

The proposed shipping route may cross 6 or 7 Ecologically and Biologically Significant Areas (EBSAs) depending on the precise route, indicated by the black dotted lines on Map 14-6. EBSAs are areas in Canada's oceans that have been scientifically assessed and identified as having unique ecological or biological importance compared to the surrounding marine ecosystem. It is crucial to treat these areas as extremely important and ensure that their ecosystems remain healthy and productive. This information supports marine planning, including environmental assessments and marine activities (DFO, 2023).

Nain Area, Ecologically and Biologically Significant Area

Both Anaktalak Bay (Option A) and Voisey’s Bay (Option C1 and C2) fall within the Nain Area EBSA, (Map 14-6), in addition to Webb Bay, Tikkoatokak Bay and Nain Bay that converge in an area along the Labrador coast (DFO, 2013). This EBSA is unique in that it is home to a diverse range of species, including waterfowl, seabirds, fish, and mammals. Notably, the area is home to several seabird and common eider colonies, as well as a capelin spawning beach. One of the most significant features of this EBSA is the large colony of thick-billed murres. The Nain Bay area is highly productive for Arctic char, contributing significantly to the rearing and feeding of juveniles and adults. Additionally, a spawning population of salmon can be found here, along with some of the largest gatherings of glaucous gulls (DFO, 2013). The coastal islands protect the fast ice from excessive compression by pack ice, creating an important wintering and breeding area for ringed seals. Additionally, this habitat is particularly important for polar bears, wolves, foxes, and seals. The habitat also serves as a migration or seasonal travel corridor for various species, including terrestrial predators and caribou. This region is characterized by common geomorphological features called boulders and boulder barricades. Voisey's Bay has the largest sand delta in the region, which is an important feature for seabirds (DFO, 2013).

14.3.1.2 Aquatic Species at Risk and Critical Habitats

The proposed route intersects the critical habitats of several aquatic species at risk, according to Fisheries and Oceans Canada (DFO), as well as the distribution for these species with status under the Species at Risk Act (SARA). These habitats and ranges are identified in the Atlantic Canada Marine Planning Atlas, generated by Fisheries and Oceans Canada, as shown in Map 14-6 by the yellow areas and the red hatched zones (DFO, 2024).

The marine route proposed for this project, from the Nain region of Labrador to Sept-Îles, Quebec, would therefore cross the critical habitats and ranges of nine (9) threatened or endangered aquatic species:

- Spotted wolf - threatened
- Northern wolf - threatened
- Atlantic fin whale - special concern
- Atlantic blue whale - endangered
- Atlantic wolf - cause for concern
- Atlantic Leatherback Turtle - endangered
- Atlantic white shark - endangered
- North Atlantic right whale - endangered
- St. Lawrence Estuary Beluga – endangered

Other marine or anadromous species with precarious status and several species of seabirds and anadromous fish of precarious status that are likely to occur in bays, coastal or marine environments along the proposed offshore route are:

- American eel, a threatened species according to COSEWIC (2012) - Species of concerns in Quebec (LEMVQ) -“vulnerable” species under the Newfoundland and Labrador Endangered Species Act (NL ESA E)
- Leach's Storm-Petrel, a seabird designated as threatened COSEWIC (2020) Atlantic population - and likely to be designated as vulnerable or threatened in Quebec (CDPNQ).
- Barrow's goldeneye, a sea duck designated as a species of special concern by COSEWIC (2011) - “vulnerable” species under the Quebec (LEMVQ) and Newfoundland and Labrador Endangered Species Act (NL ESA E)
- Harlequin Duck, a sea duck designated as a species of special concern by COSEWIC (2013) - considered vulnerable under the legislation of Quebec (LEMVQ)and Newfoundland and Labrador.
- Atlantic salmon, according to COSEWIC (2013) eastern Quebec North Shore population: special concern; western Quebec North Shore population: special concern; Anticosti Island population: endangered; interior St. Lawrence population: special concern; and southern Gaspé Gulf of St. Lawrence population: special concern.
- Polar bear, Davis Strait population, species of special concern (COSEWIC 2018), - considered vulnerable under the legislation of Quebec (LEMVQ) and Newfoundland and Labrador.

Studies to be conducted:

No studies or surveys are planned for the offshore portion of the proposed marine route, as the area is already regulated by various agencies. The licensed marine shipping company appointed by Torngat Metals will navigate according to the laws, standards, regulations, and restrictions in effect for the shipping route. When navigating in waters that are home to critical habitats for multiple species at risk and frequented by numerous marine mammals, it is essential to take a precautionary approach. For the purposes of this project, navigation will refer to the guidelines outlined in Part A2 of Notices to Mariners 1 to 46 (annual and monthly editions for the east), specifically the Guidelines for Marine Mammals and Marine Protected Areas published by the Canadian Coast Guard (available online at notmar.gc.ca), in order to navigate in compliance with any directives, prohibitions, speed restrictions, or other precautionary measures in effect at the time of navigation. This will help maximize efforts to protect marine mammals, species at risk, and conservation areas.

The annual number of transport vessels planned for this project is negligible, and the vessel will use a navigation route already in use (except for the port site of Option C1 and C2). Nevertheless, there are potential risks and cumulative effects associated with marine transport that could have an impact on marine and coastal mammals and other species, as well as their habitat. Table 19-9 in Section 19.2.2.4 of this report provides a general overview of the known risks and impacts of ship movements on the marine environment, including occasional events that may occur, their potential effects, and preventive and mitigating measures.

14.3.2 Vale's Port, Anaktalak Bay, Labrador Coast (access road Option A)

With the single lane access road Option A, the proposed maritime shipping route would depart from the existing Vale port located at the entrance of Edwards Cove on the south shore of Anaktalak Bay along the Labrador coast, approximately 25 km southwest of the town of Nain (Map 14-6). The Port of Vale is currently used year-round for industrial transportation of mineral concentrates extracted from the mining complex of Voisey's Bay Labrador Operations, located 10 km south of the port. Marine traffic is evidently lower on the Labrador Coast compared to the Gulf of St. Lawrence and Estuary. According to data from the Canadian Coast Guard (CCG, pers.comm.,2024), the Port of Vale has an average of 55 ship transits per year (departures + arrivals) between 2020 and 2023. In contrast, the Gulf of St. Lawrence has an average of approximately 4,770 transits per year, for the same period.

14.3.2.1 Marine Baseline Program 2012

In 2012, a marine baseline study was performed in Anaktalak Bay, as the previous Quest Rare Minerals was aiming the construction of port facilities in Edwards Cove to develop the Strange Lake Rare Earth Project. The marine baseline program field studies were conducted from September 4 to September 12, 2012 (SEM, 2013). The studies focused on two options for the port facilities in Edwards Cove and a site selected as a reference site. The primary study objectives included characterization of fish habitat, fish, and benthic communities at these sites (SEM, 2013). The biological and environmental baseline surveys, when pertinent, incorporated results from Jacques Whitford Environmental Limited's surveys conducted in 1995-96 (JWEL, 1997) during Vale's marine baseline for their EIS, in which both Anaktalak Bay and Voisey's Bay were included in the study area. Their aimed was to collect baseline environmental data for Voisey's Bay Nickel Company. The following sections are summaries from this marine baseline program conducted in 2012 (SEM, 2013).

14.3.2.1.1 Physical Description

Anaktalak Bay is located in the Labrador Coastal Barrens Ecosystem and is classified as a marine bay ecosystem (SEM, 2013). Due to its isolation from the Anaktalik River, which is significantly blocked by the Akuliaktak Peninsula to the north, the bay receives minimal freshwater. The inner section of Anaktalak Bay was classified as 'protected' from wave effects during the geomorphological characterization work carried out in 1995-96 by Jacques Whitford Environment Ltd (JWEL, 1997), based on the Modified Effective Fetch procedure (SEM, 2013). This category is defined as having a maximum wave fetch of less than 10 km with low wave exposure, except in extreme wind conditions. The bay's shorelines are stable due to the boulder barricades present (SEM, 2013). Anaktalak Bay's shoreline is primarily composed of sand and gravel flats, as well as beaches, with stretches of bedrock outcropping and pockets of marshes and estuaries. JWEL (1997ab) and SEM (2013) confirm this composition. Anaktalak Bay's shoreline is primarily composed of sand and gravel flats, as well as beaches, with stretches of bedrock outcropping and pockets of marshes and estuaries. At high tide, the coastline of the cove is mainly sandy. The sediment within the bay is unconsolidated. The upper part of the beach consists of vegetated sandy soils, while rocky shores are located towards Northeast Point. Edwards Cove shoreline is also mostly sandy, with a barrier of rocks along the low-tide mark. Intertidal flora and fauna are limited and mostly found on hard substrates such as cobbles and boulders. The surveyed sites in Edwards Cove had a maximum depth ranging from 16 to 19.0 m (SEM, 2013).

14.3.2.1.2 Fish and Fish Habitat

Fish

It is important to note that the results from the baseline surveys provided only a snapshot of the fish community at one point in time, even though extensive fishing occurred during the study period. Fish are highly mobile and, in response to changing environmental and habitat conditions, feeding conditions, prey availability, requirements for various life processes (e.g., spawning and rearing), and other factors, may move within, into, and out of the study area. Anadromous Arctic char, like other species, spend only specific and well-defined periods of time in the marine environment. They can be considered transient within the study area (SEM, 2013). The 2012 Marine Baseline fishing program utilized three fishing methods: Fukui traps, gillnets, and handlines.

- In 2012, a total of 128 fish were caught across three sampling sites in Edwards Cove. The fish species captured included shorthorn sculpin, winter flounder, Greenland cod, Arctic char, twohorn sculpin, rock gunnel, and banded gunnel. The catch rate was 0.53 fish per gear-hour (SEM, 2013), calculated from 240 hours of fishing. The fish species caught during this marine baseline program have been previously reported in Labrador and have a wide distribution along the coastal region (SEM, 2013).
- Five of the fish species caught during the 2012 marine program: twohorn sculpin, Greenland cod, winter flounder, banded gunnel, and Arctic char were also caught during the Voisey's Bay Mine/Mill environmental baseline work conducted in 1995 and 1996 by Jaques Withford Environmental Ltd (SEM, 2013).
- At all study sites, the shorthorn sculpin appeared to be a generalist, consuming a variety of organisms including other sculpins, various invertebrates such as shrimp to larger crabs, and plant material. The species likely plays an important role in the ecology of the nearshore marine environment based on the abundance of sculpins in the study area, by feeding on the abundant fauna present in the sandy-silt substrate common throughout the study area. Juvenile sculpins are a food source for several fish species, including adult sculpins through cannibalism. In addition, harp seals are known to feed on sculpins (SEM, 2013).
- The 1995 study listed three fish species: Arctic staghorn sculpin, Arctic shanny, and Atlantic warbonnet, that were not caught during the 2012 marine baseline fishing effort. In contrast, the 2012 survey captured winter flounder, rock gunnel, and Arctic char, which were not reported in 1995 (JWEL, 1996). This demonstrates that different snapshots of the fish community can be obtained from fish surveys conducted at different times of the year, in different years, and with different fishing gear (SEM, 2013).

Macroflora

- During the habitat surveys conducted in Edwards Cove in September 2012, it was found that the macroflora was abundant and diverse. Brown algae were dominant, and their distribution was highly correlated with the distribution of fine substrate. However, the flora in the intertidal zone was sparse and was interspersed with substrate material. The presence of a greater amount of flora is typically linked to finer substrate materials. (Hooper et al.,1978, 1984) described the intertidal zone of central Labrador's coastal habitats as stressed by extreme salinity, ice cover, temperature, and sedimentation. These dynamics strongly influence the marine flora in this zone. The exposed intertidal zone is typically ice-scoured annually, and only a few hardy species of algae can colonize these habitats each year. The macrofloral types identified during the 2012 baseline survey were primarily brown algae, including sea lettuce, finger kelp, sour weed, brown algae, and dead man's rope, as well as red algae in the form of coralline algae (SEM, 2013).

Macrofauna

- The macrofauna observed, using underwater video, in Edwards Cove was dominated by green sea urchins, which were moderately abundant and not enumerated but sea urchins were absent in areas with fine substrates. Blue mussels were also commonly observed, followed by sculpin species, most likely shorthorn sculpin. Echinoderms were not commonly observed at the reference site, such as sea stars and sun stars, and other invertebrates such as crabs and unidentified bivalves (SEM, 2013). More species of macrofauna were observed from the JWEL (1996) survey than from SEM in 2012, likely reflecting the fact that the JWEL survey included deep intertidal habitats and many of the invertebrates are residents of that habitat strata (SEM, 2023).

Benthic Communities

- The subtidal habitat and benthic communities in Edwards Cove were studied as part of the Voisey's Bay EIS baseline (JWEL,1996). The substrate mostly consisted of fine sand with a light covering of silt. Little marine life was observed except on hard surfaces, such as cobble, where clumps of mussels were present. Occasional clumps of algae were also visible, including seagrass, smaller red algae, and filamentous brown algae. The only fish observed were juvenile sculpins (SEM, 2023).

14.3.2.1.3 Marine Mammals (Voisey's Bay and Anaktalak Bay)

As previously described above, the planned shipping route will follow the coast of the Labrador Sea to reach the Gulf and Estuary of St. Lawrence, an integral part of the Canadian Northwest Atlantic, home to around 30 species of cetaceans (whales, dolphins and porpoises) and pinnipeds (seals and walruses) (Bernier et al. 2018). Many cetacean species migrate to this area of the Atlantic, coming from the south for part of the year, to feed in its productive waters. Conversely, some pinniped species, such as harp seals and hooded seals, migrate south from the Arctic to give birth and feed (Bernier et al. 2018).

In addition to the marine mammals listed above as threatened or endangered in the DFO Atlas, several other pinnipeds and cetacean species are also present along the proposed shipping route. The marine baseline program conducted in 2012 (SEM, 2013) included a desktop literature review on use of the proposed port study area, by marine mammals. The following section summarizes the results drawn mainly from the 1996 Marine Wildlife Technical Report prepared for Voisey's Bay Nickel Company Limited (JWEL, 1997a). The results are of quantitative marine mammal surveys conducted by boat and helicopter in the study area, namely Anaktalak Bay, Kangeklukuluk Bay, Kangeklualuk Bay and Voisey's Bay, between July and November 1996. The JWEL (1997a) surveys aimed to estimate the relative abundance of whales and seals in the study area during ice-free months for future monitoring. Incidental sightings were also recorded from various platforms of opportunity, including the Sir John Franklin (a DFO ship used to support environmental assessment studies) in Edwards Cove, Anaktalak Bay. A total of 38 boat-based and 68 helicopter-based transects were conducted. Survey data was collected by boat in July and August, and by helicopter in September and October of 1996 (JWEL 1997a; SEM, 2013). Results pertaining to Anaktalak Bay and Voisey's Bay, are highlighted below.

The ringed seal

The ringed seal is recognized as the most common pinniped in northern Labrador and the most abundant and widely distributed marine mammal in the Arctic (SEM, 2013)). Ringed seals were the most frequently observed marine mammal in Anaktalak Bay, in 1996 (JWEL, 1997a), but there were only low densities of these species recorded in Edwards Cove and Anaktalak Bay. A conservative estimate of the 1996 ringed seal population in the study area, i.e. in the four bays, was 13,500 to 15,000 individuals (JWEL, 1997). Ringed seal abundance and distribution fluctuate seasonally and annually, depending on ice conditions (JWEL, 1997a; VBNC 1996). Just south of Voisey's Bay, the Spracklin and Tunungayualoks islands near the ice edge are considered the main breeding area for ringed seals (SEM, 2013). During the spring ringed seal survey in May 1996, a contrast was observed between the few seals and the breathing holes observed along the passage leading to Anaktalak Bay, with the great abundance observed in the passages leading to Voisey's Bay (JWEL 1997a; SEM,2013). Preferences in terms of ice conditions combined with food abundance are potentially linked to the concentration of ringed seals in a given area (SEM, 2013). The results of the 1996 study would suggest that the high ratio of seals to holes in the ice and the number of mother/pup pairs counted, that this area is one of importance as a primary feeding area for pups (SEM, 2013).

Harp seal

During the 1996 surveys, harp seals were the most abundant marine mammal during August, in Voisey's Bay, (as well as Kangeklualuk Bay and Kikkik Tavak Island (SEM, 2013). Harp seals were abundant in the area from the start of the study in July 1996, following their return from their breeding grounds off the northeast coast of Newfoundland. The concentration of seals in the bays is probably linked to the distribution and abundance of Arctic char. This species of seal generally disperses northwards after its April moult, following the retreat of the pack ice to summer feeding grounds, mainly along the northern coast of Labrador and in the Arctic (Stenson and Kavanagh, 1994). This species is known to be abundant in the Nain region during summer, feeding on a variety of fish species (SEM, 2013). Its southward migration for the winter begins in November (SEM, 2013).

Harbour seal

During the 1996 surveys, the first harbor seals were observed in August in the study area, notably in Anaktalak Bay, where they were most abundant in late summer and fall (SEM, 2013). This species winters in open water areas, and in central Labrador, gives birth in June in rivers and estuaries, or on offshore rocky islands. Large concentrations of harbor seals have been observed in the area from Nackvak to Port Burwell (SEM, 2013).

Bearded seal

Bearded seals are considered rare along the coasts of Labrador, so their presence in the study area is possibly year-round, but they appear to be the least common of the pinnipeds (SEM, 2013). In 1996, the number of bearded seal sightings in the area increased over a 20-year period (SEM 2013). This species is thought to migrate north for the summer, returning to the bays to feed before freeze-up (SEM, 2013). Bearded seals were only observed in Anaktalak Bay during surveys carried out in 1996, and only during the months of July and August (JWEL,1997a; SEM, 2013).

Hooded seal

This pinniped was the least common during seal surveys carried out in 1996, being seen in low numbers and only in August and October (JWEL,1997a; SEM, 2013). From mid-March to mid-April, hooded seals give birth on pack ice, generally off the northeast coast of Newfoundland (Stenson and Kavanagh 1994; SEM, 2013).

Minke whale

In the study area, minke whales are the most common whale during open-water periods, and can generally be observed from late summer to early autumn (VBNC, 1997). The number of minke whales observed in the bays studied in 1996 increased in August and September (SEM, 2013). Minke whales are generally reported arriving at the Labrador coast in April. Nevertheless, the first were only seen in August during the 1996 surveys, and remained relatively abundant until October (SEM, 2013).

Beluga whale

Belugas are generally considered rare in this sector of Labrador (SEM, 2013). However, one (1) beluga was observed in mid-July in Anaktalak Bay and 10 in Voisey's Bay during the study. Incidental sightings began at the end of June in 1996 (JWEL,1997a; SEM, 2013). There are no quantitative data on the number of belugas in the region, and they are generally considered very rare. The beluga populations that can be observed in the area are most likely two different ones: Ungava Bay and Eastern Hudson Bay. Both beluga populations are considered endangered (JWEL 1997a; SEM, 2013).

Narwhal

Like belugas, narwhal sightings are considered rare in this area. A single incidental narwhal sighting occurred in Anaktalak Bay in late August 1996 in Voisey's Bay during the surveys (JWEL 1997a; SEM 2013). In addition, a narwhal was observed at Edwards Cove in January 2012, when it appeared to be trapped in Anaktalak Bay (SEM, 2013). The narwhal is listed as a species of special concern by COSEWIC (2004) and appears to frequent this area only rarely (SEM, 2013).

Polar bear

Polar bears are common along the northern Labrador coast, part of the Davis Strait population, however, they do not appear to frequent the inland waters of Anaktalak or Voisey bays (JWEL, 1997a; SEM, 2013). Polar bears migrate northwards along the coast, drifting with the pack ice (SEM, 2013). This marine mammal is found along the Labrador coast and is part of the Davis Strait population. Polar bears are designated as one of the species of special concern listed under the Species at Risk Act (SARA) (SEM,2013).

14.3.2.1.4 Studies to be conducted

No specific field surveys are currently planned for Edwards Cove in Anaktalak Bay if Option A for the access road is selected for this project. No additional surveys would be required at this time as the existing port in Edwards Cove is currently used by Vale. However, a desktop assessment for this specific area for the EIS will be conducted. Once an agreement is signed with Vale for the use of its port and facilities (Section 9.4.1), the licensed marine shipping company appointed by Torngat Metals will comply with the port's existing regulations, practices, and procedures, as well as any existing Indigenous agreements in force.

14.3.3 Voisey’s Bay, Labrador Coast (access road Option C1 and C2)

Voisey's Bay, located some 20 km south of Anaktalak Bay along the Labrador coast, is the project's marine shipping route starting point for both Option C (Map 14-6). The section of Anaktalak Bay targeted for potential port development by Torngat Metals is its southwestern portion. As presented for Anaktalak Bay, inventories were conducted in 1995-1996 to collect baseline environmental data for Vale EIS, during site evaluation process for a future port and for the company's future assessment and monitoring programs (JWEL, 1997a). The sections below summarise some of the highlights of the environmental baseline programs conducted in 1995-1996, excluding marine mammals which are presented in Section 14.3.2.1.3. The information presented here is primarily based on these surveys.

14.3.3.1.1 Physical Description

Voisey's Bay has a unique landscape, with sandbars that form the largest sand delta in the region. These sandbars are an important feature for seabirds (JWEL,1997c). Voisey’s Bay is also part marine bay ecosystem of Labrador Coastal Barrens Ecosystem (SEM, 2013). Similar to Anaktalak Bat, boulders and boulder barricades are common features in this bay (JWEL,1997b). The shoreline consisted of sand flats and boulders. This bay has a larger freshwater input than other surrounding bays due to the restricted entry through narrow passes and significant freshwater flow from the Kogaluk River, Konrad Creek, Kogluktokoluk Creek, and Reid Creek (JWEL, 1997b). Furthermore, the central part of the bay is more exposed to prevailing northwesterly winds. According to the Modified Effective Fetch procedure, the bay's coastline is considered 'semi-protected' from wave effects. This means that waves are typically of low intensity, except during strong wind events (JWEL, 1997), with a maximum wave fetch distance between 10 and 50 km. Currents measured at a depth of 10 meters were generally seaward, while deeper currents (over 30 meters) were landward, which is typical of estuarine current circulation (JWEL, 1997b).

14.3.3.1.2 Fish and Fish Habitat

The Nain area is highly productive for Arctic char, contributing to the rearing and feeding of juvenile and adult charr, and supports a spawning salmon population, as mentioned in Section 14.3.1.1.2 above (DFO, 2013). Historically, commercial efforts to harvest Arctic char were focused primarily in Voisey's Bay and the surrounding area (VBNC, 1996). Arctic char is a prized traditional and Indigenous food on Labrador's north coast. The only commercial fishery for Arctic char in Newfoundland and Labrador is based in that region, where the Torngat Fish Producers Co-operative operates the province's northernmost fish plant in Nain (Bird, 2021). Since the 1980s, populations of both Arctic char and Atlantic salmon have been declining. The commercial fishery for Atlantic salmon in the area stopped in the 1990s. Atlantic salmon were caught near offshore islands as they migrated to rivers further south for spawning (VBNC 1997).

The following results of baseline marine fauna studies for fish, conducted in 1996 for Vale's EIS (JWEL, 1997a), showed that fishing effort in the study area (Anaktalak Bay, Kangeklukuluk Bay, Kangeklukuluk Bay and Voisey's Bay) was concentrated in shallow water (less than 30 m deep) near shore where it was determined that fish would be more diverse and abundant (JWEL, 1997a). Fish sampling was conducted using otter trawls, beach seine, longline, gillnet and jigger. The primary objective was to determine patterns of presence, habitat use, and abundance of marine fish species in the area during late summer. Fish sampling took place in August (1996), which is likely a time of peak diversity for the area because of the presence of several pelagic species feeding on plankton (JWEL, 1997a). A total of 18 species of finfish were caught in Voisey's Bay out of a total of 28 species for the study area (compared to 19 species in Anaktalak Bay) (JWEL, 1997a). As mentioned previously, it is important to note that the results of the baseline surveys provide only a snapshot of the fish community at one point in time.

- The following species were caught at various sampling stations around Voisey's Bay during the 1996 survey: Brook trout; Arctic char; smooth flounder; winter flounder; northern sandlace; shorthorn sculpin; arctic staghorn sculpin; longhorn sculpin; grubby; fish doctor; polar eelpout; snakeblenny; banded gunnel; lumpfish; dusky snailfish; Atlantic snailfish; Atlantic spiny lumpsucker; alligator fish; and three-spined stickleback (JWEL, 1997a).
- The three most abundant species caught in Voisey's Bay during this survey were Arctic staghorn sculpin, shorthorn sculpin, and snakeblenny, followed by banded gunnel and fish doctor (JWEL, 1997a).
- The fish species collected in 1996 were considered to be widespread along the Labrador coast, and most of the species caught were found in the Northwest Atlantic, Arctic or circumpolar regions (JWEL, 1997a).
- The study found that Voisey's Bay has a gradual slope from the shoreline, which could potentially provide habitat for shallow water species. However, compared to other bays studied, species richness was low at two of the sampling stations. The bottom and outer sector of Voisey's Bay are influenced by major rivers, resulting in significant influxes of fresh water. This could limit the diversity of finfish species present due to reduced levels of salinity (JWEL, 1997a).

The lack of up-to-date information on marine fish and their habitat components in Voisey's Bay will be addressed by the marine baseline program planned for 2024, as outlined in the following Section 14.3.3.2.

14.3.3.2 Studies to Be Carried Out – 2024 Marine Baseline Workplan Next to the Port Facilities

A Marine Baseline Program will occur in 2024 in Voisey’s Bay. Besides sampling described below, a literature review of all marine environmental studies completed in the vicinity of Voisey’s Bay. Information on Arctic char and Atlantic salmon stocks from studies conducted by DFO will also be reviewed. Any information on commercial fisheries conducted in or in proximity to Voisey’s Bay will be summarized. Available traditional ecological knowledge including information on land use, transportation on sea and ice, and local resource use will also be evaluated and summarized.

14.3.3.2.1 Fish and Fish Habitat Survey

In 2024, a fish habitat survey will be completed for the proposed port site(s) footprint and would also include any adjacent areas that may be dredged. The survey will include the collection of bathymetric data using a sonar system. The survey will be completed along grid based transects, spaced at appropriate intervals (25 to 50 m). Concurrently, high-definition underwater video will be collected with a drop-down camera system. Video data will be collected from the low tide mark to beyond the outermost extent of the port footprint (25 m depth or more) along transects perpendicular from the shoreline consistent with DFO methodology described in 'A System for Characterizing and Quantifying Coastal Marine Habitat in Newfoundland and Labrador' (Kelly et al., 2009, draft). Video will be collected as one continuous transect at an approximate speed of 1 to 2 km/hr and a field of view of approximately 2 m on either side of the centerline (4 m frame of reference). A scale bar will be installed 1 m from the camera lens in the field of view to provide a size reference for video interpretation.

Intertidal habitats will be surveyed from the shore at low tide, from the low tide mark to the uppermost high tide mark using a transect based approach. Similarly, the backshore will be surveyed by extending the transects from the high tide mark to the inland extent of the marine influence. Two-dimensional habitat maps will be prepared for the following attributes:

- Habitat strata (backshore, inter-tidal, upper sub-tidal, shallow sub-tidal, moderate sub-tidal, etc., as required);
- Bathymetry;
- Substrate;
- Marine Flora;
- Marine epifauna (if encountered in sufficient quantities for mapping); and
- Integrated Habitat Types (integration of bathymetry, substrate and marine flora)

All data will be tabulated on a transect-by-transect basis as per Kelly et al. (2009, draft). The maps and tables will provide the habitat information required for the determination of potential habitat alteration disruption or destruction (HADD) associated with the marine port and related infrastructure.

Fish in the vicinity of the marine terminal will be surveyed by deploying a variety of sampling gear to determine presence/absence, relative abundance, and collect the appropriate metrics to characterize and describe the fish communities. Gear will be retrieved and redeployed to sample as many areas/habitats as possible and will include areas associated with the marine port footprint as well as control sites. The focus will be on sampling resident species and not transient species such as char and using non-lethal methods to the extent possible, except where tissue samples are required. All fish collected will be sampled for species, length, and weight. A sample of fish flesh will be collected from a selected species that is considered resident (non-migratory) and relatively abundant.

Depending on the sample sizes, specimens will be sacrificed for tissue contamination analysis, and biometric data (sex, maturity, aging, stomach content). In studies in 2012 in Anaktalak Bay, shorthorn sculpin was selected as the species that met the required criteria.

14.3.3.2.2 Zooplankton

Zooplankton samples will be collected by vertical tows with an 80 µm mesh plankton net and oblique tows using a 244 µm mesh plankton net at four sample locations. Both nets will have a diameter of 30 cm. Vertical samples (n=4) will be collected by lowering the plankton net to 1 m above the bottom and retrieving the net to the surface at a rate of 10 m/minute. Oblique samples (n=4) will be collected by towing the plankton net at the water surface behind a vessel travelling 1.8 km/h for a period of ten minutes. Plankton samples will be transferred to a 250 ml glass jar and fixed in the field with 95% alcohol, packaged, labelled, and stored as per protocols provided by the laboratory.

14.3.3.2.3 Benthic Invertebrates

Benthic infauna samples will be collected at three depth strata (0-3 m, 3-15 m and 15–25 m) along four transects across various depth strata from intertidal to 35 m. Multiple grabs will be composited into a 20-liter Rubbermaid™ tub until a sufficient sample volume has been obtained. Prior to collecting sub-samples for analyses, the oxidation-reduction (redox) of the surface sediment will be determined. After all sub-samples have been collected the remaining sediment will be retained for benthic invertebrate analysis.

Samples will be shipped to a sub-contracted experienced marine benthic taxonomy laboratory for identification and enumeration. At the analytical laboratory, all samples will be processed, and organisms identified to the lowest practical taxonomic level. Data will be reported in relation to m^2 of substrate area. Samples will be quantified, biomass determined and the appropriate metrics (e.g., taxon richness, diversity/similarity indices) calculated.

14.3.3.2.4 Water, Sediment and Biota

Water samples will be collected by establishing two sampling stations within the footprint of the marine port/dredged areas (n=4, 2 from each option) and at reference/control sites (n=2). At each station a vertical conductivity (salinity), temperature and depth profile will be collected, at 1.0 m intervals. Water from the Niskin sampling bottles will be transferred into various sampling bottles as directed by the contracted analytical laboratory who will provide all necessary sampling bottles and fixatives. Field measurements will be taken at the same time as collection of samples for laboratory analyses. A beta sample from the Niskin bottle will be collected and field measurements will be taken using a YSI 650MDS multi-parameter sonde (temperature, pH, salinity/conductivity) and an Oxyguard Polaris oxygen meter (DO, % DO saturation).

At the analytical laboratory the following analyses will be completed:

- Conventional parameters;
- TSS;
- Chlorophyll ‘a’;
- Major ions;
- Nutrients;
- Conventional metals (including mercury);
- Hydrocarbons; and
- Rare earth elements.

Sediment samples will be collected at the same time as benthic samples (see above) and, if possible (depending on substrate characteristics), from the same stations as water samples are collected (n=4, 2 from each option footprint, n=2 in control areas). Sediment/benthic sampling will be conducted only after all water sampling has been completed and samples have been stored in appropriate coolers. Sediment samples will be analyzed in the laboratory for the following

Chemical analyses:

- Major ions;
- Total organic and inorganic carbon
- Conventional metals (including mercury);
- Hydrocarbons; and
- Rare earth elements.

Physical analyses:

- Particle size (general - Wentworth)
- Particle size (detailed – Phi scale)

Collection of biota samples for baseline characterization of contaminants in tissues will include both fish and bivalves (Blue mussels). Collection of fish tissue for analyses will be conducted during the fish sampling program as described above. Adult bivalves (Blue mussels, 50-65 mm in length) will be collected by physical removal from substrates in the inter-tidal areas associated with the footprint of the marine port options and control site. All mussels will be retained as individual samples, but it may be necessary for the analytical laboratory to composite samples to have sufficient sample weight for analyses. Fish and mussel tissue samples will be shipped frozen to the selected analytical laboratory. Biota tissue samples will be analyzed in the laboratory for the following:

- Total lipids;
- Conventional metals (including mercury);
- Hydrocarbons; and
- Rare earth elements.

14.3.3.2.5 Marine Mammal and Seabird Observations

During the marine sampling field program, any incidental observations of marine mammals and seabirds will be recorded and reported. If colonies of marine birds are observed in the study area, an evaluation of the potential disturbance of marine activities (container transshipment, boat traffic) will be undertaken to evaluate the potential impacts and mitigate them. Two members of the field crew will be trained and experienced in observing marine mammals and seabirds.

14.3.4 The Bay of Sept-Îles

The Port of Sept-Îles, located in the city of the same name, on the north shore of the Gulf of St. Lawrence. It is the largest mineral port in North America, thanks to its position at the entrance to the St. Lawrence River, its semi-circular bay 10 km in diameter and its natural protection from winds and strong current, as shown on Map 14-2, and its annual loading capacity of 100 Mt of cargo (PSI, 2023). By 2023, it had become Canada's second-largest port after Vancouver, with a total of 36.6 million tonnes of cargo, mainly iron ore, transiting through the port (Fontaine, 2024). The Port of Sept-Îles has 9 wharves arranged in 5 port terminals in the bay: La Relance, Multiusager, Monseigneur-Blanche, Pointe-aux-Basques and Pointe-Noire (PSI, 2023). The *Observatoire de veille environnementale de la baie de Sept-Îles* was set up in 2013 by the *Institut nordique de recherche en environnement et en santé au travail*, INREST, with the aim of establishing a long-term monitoring system to collect and track data relating to several parameters in the bay. The results of the Observatory's monitoring work are the source of much of the information described in the environmental descriptions that follow.

Map 14-2 outlines the three different industrial port areas: Pointe-Noire, Secteur-Est and Jonction-Arnaud. The Separation Plant is located in the latest.

14.3.4.1 Biophysical Description

The Sept-Îles region is part of the Grenville geological province, associated with its mineral potential and an integral part of the Canadian Shield (Carrière, 2018). As for the bay, it comprises two physiological components: the coastal plain and its archipelago of seven islands. The archipelago is made up of islands and islets at the mouth of the bay including: the islands of La Grande Basque, Petite Basque, Petite Boule, Grosse Boule, Manowin, Corossol, and Îlets De Quen in addition to the Marconi peninsula (Pointe Noire), as shown on Map 14-2.

The Bay of Sept-Îles extends over 96.8 km² and is bounded by the mouths of the Sainte-Marguerite and Moisie Rivers and closed by the Sept-Îles Archipelago (Carrière, 2018). Most of the bay is less than 80 m deep, with a few deeper sectors (over 80 m) (Carrière, 2018). The main rivers flowing into the Bay of Sept-Îles are the Poste, au Foin, Hall and Rapides, as well as the Bois-Joli and Clet creeks. The physico-chemistry of the water is affected by the freshwater and sediment inputs from the discharge of these rivers into the bay. The main zone of sedimentation is located to the north of the bay, slightly downstream of the Hall River as far as the mouth of the du Poste River (Carrière, 2018).

The archipelago creates a natural protection for the bay against strong winds and currents, with sediment and oxygen from the rivers that flow into it, a combination that favors the growth of aquatic meadows and salt marshes, ecologically highly productive environments (Nature Québec/UQCN, 2007). The bottom of the bay is mainly characterized by soft sediments, while hard substrates such as boulders and gravel are more common along the coast (Carrières, 2018). Dredging activities are existent in the bay. Spills are also reported in the bay, including fuel leaks such as reported by the Canadian Coast Guard in 2023. [19]

14.3.4.1.1 Flora

The coastline is made up of different levels of plant species, depending on certain conditions and factors such as currents, tides, salinity, sediment supply and climate. The Bay of Sept-Îles is home to a salt meadow, a salt marsh, with cordgrass as the dominant plant, a muddy strip with no vegetation and an aquatic meadow, dominated by eelgrass. Eelgrass is present all along the perimeter of the inner bay, and continuous eelgrass beds were present, (in 2017), mainly in the western part and another in the southeastern part of the bay, as illustrated in Map14-2 (Carrière, 2018). Eelgrass beds provide a rich habitat for wildlife and are home to several links in a varied food chain made up of phytoplankton, zooplankton, molluscs, crustaceans, gastropods, and fish (Nature Québec/UQCN, 2007).

As far as macroalgae are concerned, all three major classes of algae are present along the coastline and in the bay, namely brown algae (pheophyceae), green algae, (Chlorophyceae) and the largest and most diverse group, red algae (Rhodophyceae) (Carrière, 2018). Species such as Irish moss, knotted wrack and bladder wrack are also present in the area and contribute to the diversity of eelgrass beds. The results of a study on the distribution and abundance of macroalgae in the bay area show that the algal community comprises 27 species (Carrière, 2018).

14.3.4.1.2 Fauna

The benthic community of the Port of Sept-Îles area and the archipelago, i.e. the organisms living on the bay bottom, is made up mainly of crustaceans, molluscs, and echinoderms (Bourque and Malouin, 2009; Carrière, 2018). As for the crustacean population in this area, species listed include rock crab, sand shrimp, hermit crab, barnacle and gammarus. Commercially fished crustaceans are also present, including rock crab, American lobster, snow crab and northern shrimp (Bourque and Malouin, 2009; Carrière, 2018).

The mollusc population in the port area is made up of razor clams, littorinids, limpets, Atlantic lunacy, small macoma and Arctic clamshell. Commercially fished mollusc species present in this area include blue mussels, sea scallops, soft-shell clams and whelks, as well as Stimpson's surf clam (Bourque and Malouin, 2009; Carrière, 2018). The echinoderm community is made up of several starfish species, including the common starfish, sea cucumber, flat sea urchin and green sea urchin (Bourque and Malouin, 2009; Nature Québec/UQCN, 2007).

14.3.4.1.3 Fish

A wide variety of fish species can be found in the Port of Sept-Îles area, given the conditions that favor a highly productive environment, as mentioned above, due to the supply of sediment and fresh water (Carrière 2018; Nature Québec / UQCN, 2007). The following fish species are generally found here: winter flounder, capelin, mackerel, cod, haddock, Greenland halibut, Atlantic herring, rainbow smelt, American eel, a threatened species according to

[19] La Garde côtière canadienne évalue un déversement d'hydrocarbures au port de Sept-Îles | Radio-Canada

COSEWIC (2012), and Atlantic salmon. Several species of stickleback are also found within the same zone, particularly in the eelgrass beds, as well as populations of bronze sculpin, winter flounder, smooth flounder, sand lance and Atlantic tomcod (Carrière 2018; Nature Québec / UQCN, 2007). Among the rivers that flow into the Bay of Sept-Îles, rainbow smelt spawning grounds are known to exist on the Hall, au Foin and du Poste rivers, as well as on the Bois-Joli stream (Carrière, 2018; CRECN, 2016). Some beaches around the bay also serve as Capelan spawning grounds (Carrière, 2018).

14.3.4.1.4 Marine Mammals

In terms of marine mammals, the bay is frequented by several cetacean species, most frequently minke whales and harbour porpoises (Bourque and Malouin, 2009). Some species, such as humpback whales, fin whales and blue whales, are more likely to be seen off the islands. Occasional sightings of other species are possible, such as the white-sided dolphin and the white-beaked dolphin (Bourque and Malouin, 2009). Pinnipeds also frequent the area, the main species observed being harbour and grey seals, while harp seals can be seen on the pack ice in winter (Bourque and Malouin, 2009).

14.3.4.1.5 Avifauna

As previously mentioned in Section 14.2.4.2, the Bay of Sept-Îles and Archipelago serve as a migratory stopover for several bird species, and offers a wide variety of feeding, nesting, and breeding habitats for avian fauna (Carrière, 2018). The ecological richness of this area is reflected in the abundance and wide diversity of avifauna present. The Port of Sept-Îles area is also part of an Important Bird Area (IBA), the Sept-Îles IBA. In addition to marine and coastal habitats, the IBA also includes the Checkley Plain peat bog, located north of Pointe Noire (Nature Québec / UQCN, 2007). In addition, much of the bay's shoreline is recognized as a Waterfowl Concentration Area (WCAA) (Carrière, 2018; Nature Québec / UQCN, 2007).

Bird colonies nest on certain islands in the archipelago, such as Île du Corossol, which is designated as a migratory bird sanctuary, and Île Manowin, which is home to a heronry, as shown on Map 14-2 (Carrière, 2018; Nature Québec / UQCN, 2007). This IBA was created in part because birds in the Bay of Seven Islands or in the archipelago stay there in very large numbers, which can exceed the threshold of 1% of the world population (Nature Québec / UQCN, 2007). This important bird conservation area is particularly renowned for its large gatherings of razorbills, great black-backed gulls, and herring gulls (Nature Québec / UQCN, 2007).

Certain species of seabirds and waterfowl are particularly present in habitats such as wet meadows, salt marshes and aquatic grass beds, including Canada geese, American black ducks, Barrow's goldeneyes, and common goldeneyes (Carrière, 2018 & CIC, 2009). These habitats are also home to species of shorebirds, characterized by their long, wetland-using legs: American Woodcock, Semipalmated Sandpiper, Greater Yellowlegs, Least Sandpiper, Dunlin, White-rumped Sandpiper, Wilson's Dowitcher, Silver Plover and Semipalmated Plover (Carrière, 2018; Nature Québec / UQCN, 2007).

In addition, populations of great blue herons, black-legged kittiwakes, great black-backed gulls, herring gulls, double-crested cormorants, common eiders, razorbills, common murres, black guillemots, surf scoters, black scoters, common eiders, and long-tailed ducks congregate on the islands and islets of the archipelago (Carrière, 2018; Nature Québec / UQCN, 2007).

Among the bird species that nest or frequent or have been observed in the Bay of Sept-Îles and Archipelago area, the following have special status:

- the peregrine falcon, classified as vulnerable in Quebec and Newfoundland and Labrador;
- short-eared owl, designated as special concern federally, vulnerable in Newfoundland and Labrador, and likely to be designated threatened or vulnerable in Quebec (Note that it is currently under review for a change of status). It is considered threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).
- Barrow's goldeneye is designated of special concern at the federal level and vulnerable in Quebec;

- the yellow rail is a species of concern at the federal level and threatened in Quebec;
- Nelson's sharp-tailed sparrow, likely to be designated a vulnerable or threatened species in Quebec
- the Atlantic population of Leach's Storm-Petrel is designated as federally threatened (COSEWIC 2020) and likely to be designated as vulnerable or threatened provincially (CDPNQ).

14.3.4.1.6 Protected Areas

The Sept-Îles Port Zone includes the following designated areas:

- The Sept-Îles IBA status is not officially recognized as a protected area by the government, but serves as a tool to encourage developers, decision-makers and promoters to respect the site's heritage value (Carrière, 2018; Nature Québec / UQCN, 2007). The Sept-Îles IBA covers an area of 242 km², including a section of the city of Sept-Îles, the Bay of Sept Îles and its shoreline, the Sept Îles Archipelago and the Checkley Plain, located west of the bay (Nature Québec / UQCN, 2007).
- The Quebec government introduced the power to set aside territories[20] in the Sept-Îles Archipelago in March 2021, under the Natural Heritage Conservation Act (LCPN) (MELCCFP, 2022). An area of almost 20 km² located at the mouth of the Bay of Sept Îles will be protected and consequently closed to any new industrial activity (MELCCFP, 2022). The creation of this reserve is intended to preserve the great biodiversity of these marine, terrestrial and coastal ecosystems, and to protect the archipelago's important seabird nesting sites (MELCCFP, 2022).
- Île du Corossol has had Migratory Bird Sanctuary (MBS) status (since 1937) at the provincial level, (Map 14-2) with the aim of protecting the Common eider and seabird colonies that nest there (MELCCFP, 2022; ECCC, 2017). At the provincial level, this island in the archipelago is one of the four richest sites in terms of seabird abundance and diversity (MELCCFP, 2022). Îlets De Quen and Île Petite Boule (Map 14-2) have the status of bird colonies on an island or peninsula, according to the register of protected areas in Quebec (Natural Heritage Conservation Act) (MELCCFP, 2023d).

14.3.4.1.7 Studies to Be Conducted

No studies or surveys are planned for the Port of Sept-Îles and bay area at this time as there is currently sufficient information about various components of the environment and due to existing laws and regulations, as well as the Environmental Precautionary Measures and Practices and Procedures established by the port administration (Administration Portuaire de Sept-Îles, 2017; 2022). In addition, on going monitoring with the *Observatoire de veille environnementale de la baie de Sept-Îles*, initiated by INREST in 2013, which has established a long-term monitoring system to collect and track data on various parameters in the Bay of Sept Îles. The licensed marine shipping company appointed by Torngat Metals will comply with the regulations and measures in place at the Port of Sept-Îles Authority.

[20] The power to set aside territories allows the government to ensure the protection of territories by removing them from certain industrial activities related to the research, exploitation and transportation of natural resources, until such time as a protected status is granted (MELCCFP, 2022)

15 Socio-Economic and Human Health Description

15.1 Land Use and Indigenous Ecological Knowledge

The development of the Strange Lake mining project may result in changes to land and resource use. The development, construction, operation, closure and restoration of the proposed mine site, the seasonal access road and the handling and storage facilities at Edwards Cove (option A) or the Voisey's Bay port facilities (option C) (both options are under consideration) could affect the activities of various Indigenous groups such as the Nunavik Inuit, the Naskapi Nation of Kawawachikamach, the Innu of Quebec, the Nunatsiavut Inuit and the Labrador Innu. The various phases of the project could also have an impact on Indigenous and non-Indigenous businesses and organizations, including tourism businesses, outfitters, parks and mining companies.

A study of land use and Indigenous Knowledge was carried out between 2012 and 2013 as part of the Quest Rare Minerals project (AECOM, 2013e) [21]. The study revealed that territories within or bordering the project study area were traditionally used by several Indigenous groups. It also showed that some groups still visit these territories. The use described was sporadic and of low intensity in the mine site area. Nunavik Inuit had not conducted any recent activities. Naskapi users from Quebec and Innu users from Labrador did, however, travel to the area of the proposed mine site, as well as to the vicinity of the planned road corridor (which essentially corresponded to Option A identified for the present project), for various activities, including caribou hunting in winter and waterfowl hunting in spring. The corridor identified for road construction was partly used by the Nunatsiavut Inuit, who practised activities there at various times of the year. The latter had expressed concerns about the effects of road construction and the presence of an access road near Ikadlivik Brook, particularly with regard to the impact on Arctic char populations. The Labrador Innu also practiced hunting and fishing activities near the two corridors identified for road development. The 2012-2013 study also showed that the Nunavik Inuit had historically used the territories crossed by the corridors identified for road construction but had not carried out any activities there since the 1960s-70s. All the Indigenous groups met at the time (Nunavik Inuit, Naskapi Nation of Kawawachikamach, Nunatsiavut Inuit, Labrador Innu) expressed concerns about the effect of the project (mainly the presence and operation of the mine site and access road) on caribou. The Inuit of Kangiqsualujjuaq, who use and live along the George River, also expressed concerns about the potential effects of the proposed project on the river's water quality. Maps showing land use and occupation by the various Indigenous groups considered in the 2012-2013 AECOM study are presented in Appendix H.

In addition, the 2012-2013 study revealed that both Indigenous and non-Indigenous businesses were offering recreational tourism activities in the vicinity of the proposed mine site. The owner of one of these businesses, an Innu from Matimekush, expressed concerns about the potential effects of the project on water quality in the George River, where he operates.

In addition to the proposed mine site, seasonal access road and handling and storage / port facilities on the Labrador coast, a rare earth separation plant is planned for Sept-Îles, Quebec (Sept-Îles industrial port zone). The Innu of Uashat mak Mani-utenam are likely to carry out activities in the vicinity of the Sept-Îles industrial port zone. The city of Sept-Îles and the Sept-Rivières MRC (with jurisdiction over the Sept-Îles region) will also be affected by the project, as will various Indigenous and non-Indigenous organizations and businesses operating in the vicinity of the planned separation plant. As the establishment of a rare earth separation plant in Sept-Îles was not part of Quest Rare Minerals' initial project, no studies have been carried out concerning Indigenous knowledge or land use by Indigenous groups in the region or concerning land use by Indigenous and non-Indigenous organizations or businesses.

[21] This study was carried out by AECOM in most of the Indigenous communities concerned. However, in the case of Nunatsiavut, the land-use study was conducted by Chris Furgal, Agata Durkalec, Katie Winters et al. The results of the latter study were integrated into the AECOM study.

Studies to be carried out:

A new land-use study for the various project components (the proposed mine site, the options for the seasonal access road, the handling and storage facilities at Edwards Cove, and the port facilities at Voisey's Bay) will be carried out in 2024 and 2025 with the same Indigenous groups as in 2012-2013, Nunavik Inuit (Kuujjuaq and Kangigsualujjuaq), Kawawachikamach Naskapi, Quebec Innu (Matimekush-Lac John), Nunatsiavut Inuit (Nain, Hopedale, Makkovik, Postville and Rigolet) and Labrador Innu (Sheshatshiu and Natuashish). The study will also be conducted with the Innu of Uashat mak Mani-utenam in relation to the territory affected by the rare earth separation plant in Sept-Îles. In addition to documenting the current and projected use of the territory by these different groups, the study will also gather information on their knowledge of the territories concerned, as well as the plant and animal species found there.

The first stage of the study will consist of interviews with local managers who have a good knowledge of land use in each of the Indigenous communities concerned. These interviews will form the starting point of the study and will provide an overview of the situation. They will also enable us to identify the various studies that may have been carried out by the communities, or in collaboration with them, concerning their knowledge or their occupation and/or use of the territories concerned by the present project. These initial interviews will also make it possible to determine whether the territories likely to be affected by the various project components (or their surroundings) have been visited by members of these communities in recent years. Where appropriate, more detailed interviews will be conducted with local land users (people practising traditional or recreational activities in the areas concerned). The number of users to be interviewed will be determined with the various communities concerned, according to the intensity of use. The choice of users to be interviewed will also be made in consultation with each of the communities concerned. People of different genders and ages will be identified to ensure good representativeness and to take into account the points of view of different sections of the population. Informants may be interviewed individually or in small groups. If necessary, interviews will be conducted in the interviewees' mother tongue, with the help of a local interpreter.

Interviews with land users will aim to provide a good description of current use of the areas concerned by the present project (areas visited, activities carried out, resources used or harvested, length of stay, season or period of use, approximate number of users frequenting the area, activities planned for future years, etc.). The various interviews conducted during the study with local managers and land users will also enable us to gather their expectations and concerns regarding the present project. In addition, relevant information concerning Indigenous knowledge (such as valued species and locations, etc.) will be collected during interviews with local managers and land users.

Some Indigenous groups may decide to carry out (in whole or in part) their own portion of the land-use / Indigenous knowledge study. This is notably the case for the Nunatsiavut Inuit, who will conduct the land-use study according to the rules laid down by the Nunatsiavut Research Centre.

All the information gathered during the land use and Indigenous knowledge study will be used to assess the effects of the Strange Lake mining project and identify appropriate mitigation measures. For each of the Indigenous groups involved in the study, it is planned that the entire process will be overseen by a steering committee made up of representatives of the Indigenous group, representatives of the proponent and representatives of AECOM's research team. The methodology employed, the subjects to be covered and the choice of informants to be interviewed will all be determined by these committees. Subsequently, the assessment of the project's impacts on land and resource use will also be presented to each of the committees. At the same time, improvement or mitigation measures designed to limit or eliminate the project's impacts will be developed, taking into account the issues raised by the various informants met during the study, as well as the expectations and concerns raised during the study and during engagement activities held within the communities concerned. Improvement and mitigation measures will be developed in conjunction with the steering committees established with the various Indigenous groups concerned.

A study will also be conducted to document the non-Indigenous land use and occupation within and near the territories concerned by the various project components. This study will focus on current or planned activities likely to take place within and/or near the territories concerned. It will be based on available sources, such as the websites of businesses and organizations present or active in the areas concerned, or available environmental studies carried out previously. Following this literature review, additional information will be gathered through telephone interviews with representatives of the organizations and companies identified in the documentation. These interviews will help validate and refine the information gathered during the literature review. They will also enable us to ascertain the expectations and concerns of the various companies and organizations in relation to the proposed project.

In the case of the Sept-Îles industrial-port zone, a more detailed study will consider the following components: the administrative framework, land tenure, land management and planning, land use, commercial and industrial activities, recreational and tourism activities, the built environment, infrastructures, heritage elements, and development projects. These elements will be documented through two complementary activities: a literature review and interviews with local and regional organizations and businesses.

The literature review will be based on the various sources available. With regard to the administrative framework and land tenure, available geomatic databases will be consulted. With regard to land management and planning, the *schéma d'aménagement et de développement (SAD)* of the MRC de Sept-Rivières will be consulted, as well as the urban plan and zoning bylaws of the city of Sept-Îles, and the water master plan of the Duplessis watershed organization. Data published by various government organizations will also be consulted. In addition, existing infrastructures, the built environment, land use, as well as commercial, industrial and recreational activities will be characterized using information from the various geomatic databases available. In addition, the websites of various local and regional businesses and organizations will be consulted, providing information on current infrastructure and uses, as well as future planning and development projects. The websites of various government departments and agencies (including the *Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs* (MELCCFP) and the Canadian Wildlife Service) will also be consulted to describe potential uses of the area. Heritage elements will be described, notably by consulting planning documents, and by extracting and analyzing data from the *Répertoire du patrimoine culturel du Québec* available on the website of the *Ministère de la Culture et des Communications*. In addition, the various environmental studies carried out previously on the Sept-Îles industrial-port zone will be consulted, in order to document the non-Indigenous use and occupation of the area.

To supplement the information provided by the literature review, representatives of the organizations and businesses identified in the literature review will be consulted by telephone or videoconference. In particular, interviews will be conducted with representatives of the city of Sept-Îles and the MRC de Sept-Rivières and may also be conducted with representatives of other organizations or businesses (Duplessis watershed organization, hunting and fishing associations, commercial fishing association, MELCCFP wildlife protection officer, etc.). In addition to gathering information to describe the current situation, the interviews will also identify and locate planned development projects, and document the expectations and concerns of the various organizations and businesses with regard to the Strange Lake mining project.

15.2 Socio-Economic Conditions, Local Capacity Analysis, and Workforce Analysis

As part of the Quest Rare Minerals project, studies were conducted with different Indigenous and non-Indigenous communities that could potentially be affected by the project, aiming to describe their socio-economic conditions, local services, and workforce capacities (AECOM, 2013f, 2013g, and 2013h). Several issues were raised during that time. For Indigenous communities, these issues included education levels, health, social problems, and economic characteristics such as limited employment opportunities, high unemployment rates, and low specialization levels. All Indigenous groups encountered shared common values related to the preservation of natural habitats and traditional harvesting activities. Non-Indigenous communities affected by the Strange Lake project (namely Schefferville, Fermont, Sept-Îles) were experiencing an economic boom in the mining and/or resource sectors, leading to an increasing demand for accommodations, infrastructure, and municipal services.

Studies to be carried out:

Within the framework of the present project, a new documentary study will be carried out in 2024-2025 using available sources. This will provide up-to-date socio-economic information on the various communities involved, as well as an accurate description and assessment of their local services and workforce.

Telephone interviews will also be conducted with key informants in the involved communities, as well as with government organisations to document specific topics such as education, health care and health issues, social services and social issues, housing, economic development, as well as the labour force situation and the ability of local businesses to meet the needs of Torngat Metals. Once again, the methodology presented here may be adjusted in response to requests from the various Indigenous groups concerned. It is also possible that certain Indigenous groups will choose to conduct all or part of the portion of the study concerning them.

The following sections provide a brief overview of the socio-economic conditions of the different Indigenous and non-Indigenous communities involved in the present project. It is important to mention that the data presented in Socio-Economic and Human Health section (Section 15.3) are based on an initial review of available literature. Information presented will be complemented during the impact study to provide a more accurate and updated socio-economic and health profile. This update and refinement of data will be done through further literature research, as well as meetings and interviews with stakeholders from the concerned communities. It is important to note that the list of communities affected by the project is subject to change; other communities may be added to this list during the study and analysis.

Under the Impact Assessment Act (IAA), sex, gender and intersecting identities are a factor to be taken into account when assessing the impact of a designated project (Section 22(1)(s) of the Act). Indeed women, girls, young people, the elderly and people with different gender identities experience development projects differently. Thereby, it is also important to mention that the data will be presented using GBA Plus, so that we can subsequently assess the social, economic, health and environmental effects, both positive and negative, and impacts on Indigenous peoples and other population groups. Methods will be intersectional (include multiple identity factors) and will depend on the communities. In doing so, GBA Plus ensures that negative effects can be identified and mitigated. This leads to better results and more informed decision-making in the public interest.

The GBA Plus will be used as an analytical tool to reflect how project activities may affect population subgroups differently, and thus better target mitigation measures. To better understand the project's impact on Indigenous groups, the ESIA will also take into account the political, socio-economic and cultural realities of Indigenous women and people of diverse gender identities, using culturally relevant gender-based analysis (CRGBA) (Native Women's Association of Canada, 2020a; 2020b). Unlike Gender-Based Analysis Plus (GBA Plus), CRGBA goes further and considers current historical issues, including the historical and ongoing effects of colonization, the legacy of residential schools, and intergenerational trauma among Indigenous people. These various analyses will make it possible to assess the social, economic, health and environmental effects, as well as the impacts on Indigenous peoples and other non-Indigenous population groups. The GBA Plus and CRGBA will ultimately make it possible to identify and mitigate the negative effects of the proposed project on these various population groups targeted by the project.

15.2.1 Non-Indigenous and Indigenous Communities in Quebec

15.2.1.1 Sept-Îles

The population of the city of Sept-Îles was 24,569 in 2021, a decrease of 3.3% since the 2016 census (25,400 inhabitants). In 2021, the average age was 43.2 years, compared to 42.8 years for the entire province of Quebec and 43.9 years in the Côte-Nord region. Just over 63% of the population (15,520 inhabitants) was in the 15-64 age group, a similar percentage to the province as a whole. Among the population aged 15 and over, 23% had no diploma (18.2% in Quebec and 27.7% in the Côte-Nord region), 21% had only a high school diploma (21.4% in Quebec and 21% in the Côte-Nord region), and 55% had obtained a certificate, diploma, or post-secondary degree (60.4% in Quebec and 51.4% in the Côte-Nord region). The primary language spoken in households was French (94%, compared to 77.5% for the entire province of Quebec) (Statistics Canada, 2023).

In 2021, the median annual household income in Sept-Îles was $80,000, a median income higher than that of the province of Quebec ($72,500) and the Côte-Nord region ($76,500). The labor force represented 65% of the population. The employment rate was 61.7%, a rate higher than the overall rate for Quebec (59.3%), while the unemployment rate was 5%, a rate lower than that of the province and the Côte-Nord region (7.6% and 7.5%). The occupied jobs were primarily in the tertiary sector (71%), with a significant portion (22%) also in the secondary sector. The primary sector accounted for 7% of the occupied jobs. The sector with the most workers was healthcare and social assistance (1,970 people), followed by retail trade (1,760 people) (Statistics Canada, 2023).

15.2.1.2 Fermont

Between 2016 and 2021, the population of Fermont decreased by 8.8%, going from 2,474 inhabitants to 2,256 inhabitants. In 2021, the 15-64 age group represented 73% of the population (1,650 inhabitants), and the average age was 33 years, which is about ten years below the Quebec average (42.8 years) and the Côte-Nord region average (43.9 years). Among the population aged 15 and over, nearly 9% had no diploma, which is half the rate of Quebec (18.2%) and one-third the rate of the entire Côte-Nord region (27.7%); 19% had only a high school diploma (21.4% in Quebec and 21% in the Côte-Nord region), and 72% had obtained a certificate, diploma, or post-secondary degree (60.4% in Quebec and 51.4% in the Côte-Nord region). Similar to Sept-Îles, French was the dominant language spoken at home with 96% (Statistics Canada, 2023).

In 2021, the labor force participation rate in Fermont was 82.5%, and the employment rate was 80.5%. These rates were the highest among all the communities involved in the project, surpassing those of the province (64.1% and 59.3% respectively) and the North Shore region as a whole (60.5% and 55.9%). The unemployment rate in Fermont, which was only 2.4%, was the lowest among all the communities affected by the project. In the same year, the unemployment rate was 7.6% for the entire Quebec and 7.5% in the Côte-Nord region. The median annual household income was $172,000, which was the highest among all the communities involved in the project and significantly higher than the median income for the entire province ($72,500) or the entire region ($76,500). As Fermont is a mining town, the primary sector accounted for a little over half (55%) of the occupied jobs. The secondary sector accounted for only 12%, while the tertiary sector represented one-third (33%) of the occupied jobs (Statistics Canada, 2023).

15.2.1.3 Schefferville

The population of the municipality of Schefferville had 244 inhabitants in 2021, compared to only 130 in 2016, representing a significant increase of 87%. In 2021, the average age was 37 years, which is lower than the overall average for the province (42.8 years) and the Côte-Nord region (43.9 years). Three quarters (75%) of the population of Schefferville was in the 15-64 age group. Among the population aged 15 and over, 12.8% had no diploma (18.2% in Quebec and 27.7% in the Côte-Nord region), 23.1% had only a high school diploma (21.4% in Quebec and 21% in the Côte-Nord region), and 61.5% had a certificate, diploma, or post-secondary degree (60.4% in Quebec and 51.4% in the Côte-Nord region). The primary language spoken in households was French (40%), followed by English (20%) and Indigenous languages (16%) (Statistics Canada, 2023).

In 2021, the labor force participation rate in Schefferville was 79.5%, which was higher than the rate in Quebec (64.1%) and the Côte-Nord region (60.5%). The employment rate was 74.4% (59.3% in Quebec and 55.9% in the Côte-Nord region), and the unemployment rate was 6.5%, which was lower than the rates for the entire province (7.6%) and the Côte-Nord region (7.5%). The median household income was $83,200 in 2016 (no data available for 2021). In 2021, no residents of Schefferville were employed in the primary sector, and only 5% of the jobs were in the secondary sector (transportation and warehousing), indicating that the majority of jobs were related to the tertiary sector. The fields that employed the most workers were education (50 people) and public administration (40 people) (Statistics Canada, 2023).

15.2.1.4 Kuujjuaq

Kuujjuaq is one of the 14 northern villages in Nunavik. The community saw its population decline by 3% between 2016 (2,754 inhabitants) and 2021 (2,668 inhabitants). In 2021, women accounted for nearly 52% of the population, the same proportion as for the entire province of Quebec, and the largest age group was the 15-64 age group (1,740 inhabitants). The average age was 30.5 years, which is significantly lower than the average age in the

province (42.8 years). In 2021, nearly 42% of the residents of Kuujjuaq had no diploma, more than twice the rate for the entire province (18.2%). Additionally, 21% had only a high school diploma (21.4% in Quebec), while 38% of the residents had a certificate, diploma, or post-secondary degree (60.4% in Quebec). The primary language spoken at home was Inuktitut, used in 56% of households, followed by English (23% of households) and French (14%) (Statistics Canada, 2023).

In 2021, Kuujjuaq had an unemployment rate of 4.2%, one of the lowest among the communities involved in this project, and lower than the provincial rate (7.6%). The activity rate was 75.7% (64.1% in Quebec) and the employment rate 72.3% (59.3% in Quebec). The median household income was $110,000 in 2020, higher than that of the province as a whole ($72,500). It should be noted, however, that the cost of living is higher in Nunavik than in the southern part of the province. The tertiary sector was the most important employment sector in 2021, accounting for just over 90% of jobs held. This is largely due to the fact that Kuujjuaq is the administrative and political center of Nunavik. The secondary and primary sectors accounted for only 7% and 2% of jobs respectively (Statistics Canada, 2023).

15.2.1.5 Kangiqsualujjuaq

Kangiqsualujjuaq is another northern village in Nunavik. Its population increased by 1.5% between 2016 (942 inhabitants) and 2021 (956 inhabitants). In 2021, men were the majority and represented 53% of the population. The average age of the residents was 27.2 years, which is also significantly lower than the average age in the province (42.8 years). The largest age group was the 15-64 age group, accounting for 62% of the population (595 inhabitants). In 2021, nearly 71% of the population aged 15 and over had no diploma, which was more than three times the rate for the entire province (18.2%). Additionally, 18% had only a high school diploma (21.4% in Quebec), and nearly 8% had a certificate, diploma, or post-secondary degree (60.4% in Quebec). Inuktitut was the main language spoken in households (used in 91.6% of households) (Statistics Canada, 2023).

In 2021, Kangiqsualujjuaq had an unemployment rate of 12.2%, which was the highest rate among all the communities involved in the proposed project, significantly surpassing the rate of the province of Quebec (7.6%). The labor force participation rate was 64.6%, and the employment rate was 57.5%, relatively similar to the rates in Quebec (64.1% and 59.3% respectively). The median household income was $91,000, which is higher than the prevailing income for the entire province ($72,500), where the cost of living is generally lower. The tertiary sector (mainly education and public administration) accounted for just over 90% of the occupied jobs. The primary (4%) and secondary (5%) sectors represented only a small proportion of the occupied jobs.

15.2.1.6 Kawawachikamach

The Naskapi community of Kawawachikamach had a population of 641 inhabitants in 2021, representing a 6.7% increase since 2016 (601 inhabitants). In 2021, the average age in the community was 31.1 years, which is about ten years younger than the average for the province of Quebec (42.8 years). The 15-64 age group accounted for a little over two-thirds of the population (67.2%). Among the population aged 15 and over, 53.5% had no diploma, a proportion three times higher than the provincial average for Quebec (18.2%). Additionally, 25% held only a high school diploma (21.4% in Quebec), and 22.8% had a certificate, diploma, or post-secondary degree (60.4% in Quebec). The primary language spoken in households was Naskapi (68.8%), followed by English at 19.5% (Statistics Canada, 2023).

In 2021, the labour force participation rate in Kawawachikamach was 52.2%. The employment rate was 47.8%, while the unemployment rate was 10.4%. These indicators were less favorable than in the province of Quebec as a whole (64.1%, 59.3% and 7.6% respectively), and in the Côte-Nord region (60.5%, 55.9% and 7.5%). The median household income was $89,000 in 2020, higher than that of the province ($72,500) and the Côte-Nord region ($76,500). Employment in this community was mainly in the tertiary sector (75% of jobs), particularly in public administration. The primary sector accounted for just under 10% of jobs and the secondary sector for around 15%. (Statistics Canada, 2023).

15.2.1.7 Matimekush – Lac John

The two Innu communities of Matimekush and Lac John are administered by the same band council. They are therefore considered a single entity.

Matimekush saw its population increase by 3.6% between 2016 (638 inhabitants) and 2021 (661 inhabitants). At that time, women were in the majority, accounting for 58% of the population. The 15 - 64 age bracket was the largest, accounting for almost 60% of the population. The average age was 30.6 years, more than a decade younger than for the province of Quebec as a whole (42.8 years) and for the Côte-Nord region as a whole (43.9 years). Nearly 54% of the population aged 15 and over had no diploma, a proportion three times higher than for Quebec as a whole (18.2%). Only 13% had only a high school diploma (21.4% in Quebec), while almost 34% had a post-secondary certificate, diploma or degree (60.4% in Quebec). Indigenous languages (Innu, Naskapi and Inuktitut) were the most widely spoken in the community's homes (in use in 88% of households), followed closely by French (9%) and English (3%) (Statistics Canada, 2023).

In 2021, Matimekush's labour force participation rate was 60.9%, lower than that of the province as a whole (64.1%), but similar to that of the North Shore region as a whole (60.5%). The employment rate was 54% (59.3% in Quebec and 55.9% in the Côte-Nord region) and the unemployment rate was 11.3%, well above the provincial (7.6%) and regional (7.5%) averages. The median household income was $84,000 in 2020, higher than that of Quebec ($72,500) and the Côte-Nord region ($76,500). The majority of jobs were in the tertiary sector (around 80%). Just under 10% of jobs were in the primary sector, and just over 10% in the secondary sector (Statistics Canada, 2023).

Very little data is available for Lac John. In 2021, the population was 21, compared with 33 in 2016. There was therefore a significant drop in population (36.4%) between the two censuses. The 2021 and 2016 censuses present no other demographic data, nor any information on graduation rates, languages spoken, the economic situation or the employment situation in Lac John (Statistics Canada, 2023).

15.2.1.8 Uashat mak Mani-utenam

Like Matimekush and Lac John, the Innu communities of Uashat and Mani-utenam are administered by the same band council (Innu Takuaikan Uashat mak mani-utenam) and are therefore considered a single political entity. They are, however, two distinct agglomerations.

In Uashat, the population declined by 2.6% between 2016 and 2021, from 1,592 to 1,550. In 2021, women were slightly in the majority (51%). The average age in the community was 32.4 years, some ten years younger than for the province of Quebec as a whole (42.8 years) and for the Côte-Nord region as a whole (43.9 years). The 15 - 64 age group was the largest, representing 61.4% of the population. Nearly 58% of the population aged 15 and over had no diploma, a proportion three times higher than for Quebec as a whole (18.2%). A further 13% had only a high school diploma (21.4% in Quebec), and 29% had obtained a post-secondary certificate, diploma or degree, half as many as in the Quebec population as a whole (60.4%). French was the language most frequently spoken at home (used in 61% of households). Innu was the main language spoken in 37% of households (Statistics Canada, 2023).

In 2021, the unemployment rate in Uashat was 12.2%, much higher than the provincial (7.6%) and regional (7.5%) rates. The employment rate (40.4%) was also lower than that for the province as a whole (59.3%) and the region (55.9%). The same was true for the labour force participation rate, which was only 46%, compared to 64.1% in Quebec and 60.5% in the Côte-Nord region. In 2020, median household income was also lower in Uashat ($67,000) than in the province as a whole ($72,500) and in the Côte-Nord region ($76,500). In 2021, the main employment sector was the tertiary sector (nearly 80% of jobs held), with many people working in the public administration sector. The primary sector accounted for just under 5% of jobs and the secondary sector for just over 15% (Statistics Canada, 2023).

Mani-utenam's population grew by 4.4% between 2016 and 2021, from 1,542 to 1,610. In 2021, women were slightly in the majority (51.6%). The average age in the community was 31.7 years, some ten years younger than for the province of Quebec as a whole (42.8 years) and for the Côte-Nord region as a whole (43.9 years). The 15 - 64 age bracket was the largest, representing 59.3% of the population. Nearly 41% of the population aged 15 and over had no diploma, a proportion more than twice as high as for Quebec as a whole (18.2%). A further 9% had only a high school diploma (21.4% in Quebec), and 22.7% had a post-secondary certificate, diploma or degree, half as many as in Quebec as a whole (60.4%). Innu was the language most frequently spoken at home (used in 48.8% of households), while French was the main language used in 38.8% of households (Statistics Canada, 2023).

In 2021, the Mani-utenam reserve had an unemployment rate of 11.6%, which was higher than the provincial rate (7.6%) and the regional rate (7.5%). The employment rate (45.2%) was lower than that for the province as a whole (59.3%) and the region (55.9%). The same was true for the labour force participation rate, which was only 51.1%, compared to 64.1% in Quebec and 60.5% in the Côte-Nord region. In 2020, median household income was also lower in Mani-utenam ($71,000), than in the province as a whole ($72,500) and in the Côte-Nord region ($76,500). In 2021, the tertiary sector will account for nearly 72% of jobs. This was due in part to the fact that many people in the community worked in the public administration sector. The primary sector accounted for just under 10% of jobs and the secondary sector for just over 18% (Statistics Canada, 2023).

15.2.2 Non-Indigenous and Indigenous Communities in Labrador

15.2.2.1 Happy Valley-Goose Bay

Happy Valley-Goose Bay had a population of 8,040 inhabitants in 2021. Between 2016 and 2021, its population remained stable with a slight decrease of -0.9%. In 2021, the age group of 15-64 years was the largest, representing 69.6% of the population. The average age was 39.2 years, which was similar to the overall Labrador average (38.4 years) but lower than the average for the province of Newfoundland and Labrador (45.5 years). Over half (58.8%) of the population aged 15 and over held a certificate, diploma, or post-secondary degree, which was a higher proportion than in Labrador (52.9%) and the entire province (51.9%). However, nearly 30% only had a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and a little over 13% had no diploma, which was lower than the rates in Labrador (21.2%) and the entire province (20.4%). English was the dominant language, being the language spoken in 94.7% of households, a percentage similar to that of the province (97.9% of households) and slightly higher than in the overall Labrador region (90.5% of households). Innu (1.6%) and French (0.4%) were spoken in a marginal number of households (Statistics Canada, 2023).

In 2021, the activity rate in Happy Valley-Goose Bay was 71.5%, and the employment rate was 64.4%, which were the highest activity and employment rates among the Labrador communities covered by the project. These rates were respectively higher than 67.6% in Labrador (67.6% for the employment rate and 59.1% for the activity rate) and 56.1% for the province as a whole (56.1% for the employment rate, and 59.1% in Labrador and 47.5% for the province as a whole for the activity rate). The unemployment rate in Happy Valley-Goose Bay was also the lowest (9.7%, which was the lowest among the communities covered by the project in Labrador, and lower than the rate for the province (15.2%) and Labrador (12.6%). The median household income was $107,000, which was lower than Labrador ($112,000), but higher than the province of Newfoundland and Labrador ($71,500). The tertiary sector accounted for 78% of occupied jobs, primarily in the fields of healthcare, social assistance, and public administration. This is mainly due to Happy Valley-Goose Bay being the central public service centre for Labrador, with several institutions and services located there. The secondary sector accounted for 16% of occupied jobs, and the primary sector was the least significant, accounting for only 6% of occupied jobs (Statistics Canada, 2023).

15.2.2.2 North West River

The municipality of North West River experienced a slight increase (2.4%) in its population between 2016 and 2021, growing from 547 to 560 inhabitants. In 2021, women accounted for nearly 53% of the population, and the age group of 15-64 years was the largest, representing 61% of the population. The average age was 44.4 years, a figure similar to the overall average for the province of Newfoundland and Labrador (45.5 years) but higher than that of Labrador (38.4 years). Just under 14% of the population aged 15 and over had no diploma, a proportion lower than the rates in Labrador (21.2%) and the entire province (20.4%). Nearly 30% of the population aged 15 and over in North West River held only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland

and Labrador), and 56% had obtained a certificate, diploma, or post-secondary degree (52.9% in Labrador and 51.9% for Newfoundland and Labrador). English was the most commonly spoken language at home, being used in 99% of households (Statistics Canada, 2023).

In 2021, the activity rate was 61.7% and the employment rate was 53.2%, which was slightly less favorable than the overall Labrador rates (67.6% and 59.1% respectively), but more favorable than the rates for the entire province (56.1% for employment rate and 47.5% for activity rate). The unemployment rate was 12.1%, a rate similar to that of Labrador (12.6%) and lower than that of the province (15.2%). The median household income was $94,000 per year, which was lower than Labrador ($112,000), but higher than the province of Newfoundland and Labrador ($71,500). The primary and secondary sectors accounted for only 10% each of the occupied jobs in the community. On the other hand, the tertiary sector was much more significant, representing 80% of the occupied jobs. It is worth noting that one in six jobs in North West River was related to public administration (Statistics Canada, 2023).

15.2.2.3 Labrador City

The town of Labrador City had a population of 7,412 inhabitants in 2021, which was slightly higher than in 2016, when the population was 7,220. In 2021, men accounted for nearly 52% of the population, and the age group of 15-64 years was the largest, representing 70.5% of the population. The average age was 37.8 years, which was younger than the overall average for the province of Newfoundland and Labrador (45.5 years) and slightly younger than that of Labrador (38.4 years). A little more than 11% of the population aged 15 and over had no diploma, a proportion lower than the rates in Labrador (21.2%) and the entire province (20.4%). Nearly 27% of the population aged 15 and over in Labrador City held only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and 61.6% had obtained a certificate, diploma, or post-secondary degree, which was a higher rate than for Labrador (52.9%) and Newfoundland and Labrador (51.9%). English was the most commonly spoken language at home, being used in 94% of households (Statistics Canada, 2023).

In 2021, the activity rate was 72.6% and the employment rate was 68.6%, which was more favorable than the overall Labrador rates (67.6% and 59.1% respectively), and much more favorable than the rates for the entire province (56.1% for employment rate and 47.5% for activity rate). The unemployment rate was 5.5%, a rate much lower than the Labrador (12.6%) and the province (15.2%) rates. The median household income was $147,000 per year, which was higher than Labrador ($112,000), and much higher than the province of Newfoundland and Labrador ($71,500). The primary sector accounted for a large share of the jobs market in Labrador City in 2021, representing almost 43% of all jobs. This is hardly surprising, given that the mining sector is the main economic driver in the town. The secondary sector also accounted for a significant proportion of jobs, representing 11%. However, it was the tertiary sector that was the most important, accounting for almost 47% of jobs. (Statistics Canada, 2023).

15.2.2.4 Wabush

The town of Wabush had a population of 1,964 in 2021, which was slightly higher than its 2016 population (1,906 inhabitants). In 2021, men accounted for a little more than 51% of the population, and the age group of 15-64 years was the largest, representing nearly 70% of the population. The average age was 36.8 years, which was a little bit younger than the overall average for Labrador (38.4 years) and much younger that overall average for the province of Newfoundland and Labrador (45.5 years). Just over 10% of the population aged 15 and over had no diploma, a proportion much lower than the rates in Labrador (21.2%) and the entire province (20.4%). A little more than 26% of the population aged 15 and over in Wabush held only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and 63.2% had obtained a certificate, diploma, or post-secondary degree (52.9% in Labrador and 51.9% for Newfoundland and Labrador). English was the most commonly spoken language at home, being used in 97% of households (Statistics Canada, 2023).

In 2021, the activity rate was 76.7% and the employment rate was 73.3%, which was much more favorable than the overall Labrador rates (67.6% and 59.1% respectively) and the entire province rates (56.1% for employment rate and 47.5% for activity rate). The unemployment rate was 4.5%, which was the lowest among the Labrador communities concerned by the current project and much lower than the Labrador overall average (12.6%) and that of the province (15.2%). The median household income was $151,000 per year, which was much higher than the overall value for Labrador ($112,000) and for the province of Newfoundland and Labrador ($71,500). The primary

sector was a major part of the job market, accounting for just over 36% of jobs. As in Wabush, the importance of the primary sector is essentially linked to the major role played by the mining industry in the local economy. The secondary sector also played a significant role, accounting for almost 14% of jobs in the town. However, the tertiary sector was the most important, accounting for around 50% of jobs (Statistics Canada, 2023).

15.2.2.5 Nain

Nain is an Inuit community in Labrador. Its population has dropped by nearly a quarter (24.7%) between 2016 and 2021, decreasing from 1,125 to 847 inhabitants. In 2021, the most significant age group was the 15-64 years, representing almost two-thirds (64%) of the population. The average age was 30.6 years, which is slightly lower than the overall Labrador average (38.4 years) and much lower than the average for the province of Newfoundland and Labrador (45.5 years). Nearly 41% of the population aged 15 and over had no diploma, more than double the proportion in Labrador (21.2%) and the entire province (20.4%). One-third (33%) of the population aged 15 and over held only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and 27% had obtained a certificate, diploma, or post-secondary degree (a lower proportion than in Labrador (52.9%) and the overall Newfoundland and Labrador (51.9%)). English was the most frequently spoken language at home (used in 93.5% of households). It is worth noting that Inuktitut was the main language spoken in only 4% of households (Statistics Canada, 2023).

The activity rate in Nain was 58.5% in 2021 (59.1% in Labrador and 47.5% for the entire province). The employment rate was only 52.5% (67.6% in Labrador and 56.1% for the entire province), and the unemployment rate stood at 10.1%, lower than both Labrador (12.6%) and the province (15.2%). The median household income was $89,000, a figure lower than Labrador ($112,000) but higher than the province of Newfoundland and Labrador ($71,500). The majority of jobs in Nain were in the tertiary sector (71%). Public administration employed a significant number of workers, which is not surprising as Nain is the political and administrative center of Nunatsiavut. Nearly 20% of the occupied jobs were related to the secondary sector, and only 10% of the jobs were in the primary sector (Statistics Canada, 2023).

15.2.2.6 Hopedale

Hopedale, an Inuit community in Labrador, has seen its population increase by 3.8% since 2016. In 2016, the population was 574 inhabitants, and the 2021 census reported 596 inhabitants. In 2021, over 66% of the population belonged to the 15-64 age group (395 individuals). The average age in the community was 32.6 years, which is lower than the Labrador average (38.4 years) and significantly lower than the average for the province of Newfoundland and Labrador (45.5 years). Among the population aged 15 and over, 37.9% had no diploma, a significantly higher proportion than in Labrador (21.2%) and the entire province (20.4%). Furthermore, 36.8% had only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and 40.4% held a certificate, diploma, or post-secondary degree (a lower proportion than in Labrador (52.9%) and the overall Newfoundland and Labrador (51.9%)). The primary language spoken in households was English, used in almost all homes (99% of them), slightly higher than the province (97.9% of households) and slightly higher than the overall Labrador (90.5% of households) (Statistics Canada, 2023).

In 2021, the activity rate in Hopedale was 49.4%, and the employment rate was 39.1%. The unemployment rate was significant, reaching 20.9%, surpassing both the province of Newfoundland and Labrador (15.2%) and Labrador itself (12.6%). The median household income was $71,000, similar to that of the province of Newfoundland and Labrador ($71,500) but lower than Labrador ($112,000). The tertiary sector was the largest employment sector (slightly over 80% of occupied jobs). The primary and secondary sectors had less significance, accounting for only 10% and 8% of occupied jobs, respectively (Statistics Canada, 2023).

15.2.2.7 Makkovik

The population of the Inuit community of Makkovik was 365 inhabitants in 2021, a decrease of 3.2% since the 2016 population census (377 inhabitants). In 2021, the average age was 37.5 years, making the population slightly younger than Labrador (where the average age was 38.4 years) and significantly younger than the entire province of Newfoundland and Labrador (where the average age was 45.5 years). The 15-64 age group was the most significant, representing approximately two-thirds (67%) of the population. Among the population aged 15 and over, 28% had no diploma, which was higher than in Labrador (21.2%) and in the entire province (20.4%). Additionally,

nearly 30% held only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and 40% possessed a certificate, diploma, or post-secondary degree (a lower proportion than in Labrador (52.9%) and the overall Newfoundland and Labrador (51.9%)). The primary language spoken in households was English, used in 98.6% of households (Statistics Canada, 2023).

In 2021, the activity rate in Makkovik was 57.9% (59.1% in Labrador and 47.5% for the entire province), and the employment rate was 42.1% (67.6% in Labrador and 56.1% for the entire province). The unemployment rate was the highest among the communities in Labrador covered by the proposed project, with over a quarter of the active population unemployed (27.3%). However, this rate was lower than the unemployment rate for the entire Nunatsiavut (29.7%). It is worth mentioning that the unemployment rate for the province of Newfoundland and Labrador was 15.2%, and for Labrador, it was 12.6% for the same year. The tertiary sector was the most significant employment sector (66% of occupied jobs). Nevertheless, the primary (18%) and secondary (16%) sectors also had notable shares of local employment. The median household income was $79,500 (Statistics Canada, 2023).

15.2.2.8 Postville

The population of the Inuit community of Postville was 188 inhabitants in 2021, an increase of 6.2% since the 2016 population census (177 inhabitants). In 2021, the average age was 41.6 years, making the population slightly younger than the average for the entire province of Newfoundland and Labrador (45.5 years), but older than the average for Labrador (38.4 years). The 15-64 age group was representing 57,9 of the population. Among the population aged 15 and over, 34.5% had no diploma, which was much higher than the overall values for Labrador (21.2%) and in the entire province (20.4%). Additionally, a little more than 24% held only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and 44.8% possessed a certificate, diploma, or post-secondary degree (a lower proportion than in Labrador (52.9%) and the Province (51.9%)). The primary language spoken in households was English, used in 100% of households (Statistics Canada, 2023).

In 2021, the economic conditions in Postville were less favorable than in Labrador as a whole or in the province as a whole. The activity rate was 62.1% compared with 59.1% in Labrador and 47.5% for the entire province. The employment rate was 48.3% compared with 67.6% in Labrador and 56.1% for the entire province. The unemployment rate was of 16.7% which was sightly higher than the rate for the province of Newfoundland and Labrador (15.2%), and higher than the rate for Labrador (12.6%). However, the unemployment rate in Postville was lower than the rate for the entire Nunatsiavut (29.7%). Nearly 24% of jobs in the community in 2021 was in the primary sector. However, the rest of the jobs held (roughly 76%) were in the tertiary sector. The median household income in Postville for 2020 is not known (Statistics Canada, 2023).

15.2.2.9 Rigolet

The population of the Inuit community of Rigolet was 327 inhabitants in 2021, compared with 305 inhabitants in 2016 (an increase of 10.7%). In 2021, the average age was 38.3 years, making the population younger than the average for the entire province of Newfoundland and Labrador (45.5 years), but same age of the average for Labrador (38.4 years). The 15-64 age group was representing 63,1 of the population. Among the population aged 15 and over, 32.0% had no diploma, which was much higher than the overall values for Labrador (21.2%) and in the entire province (20.4%). Besides, 20.0% held only a high school diploma (compared to 25.9% in Labrador and 27.6% for Newfoundland and Labrador), and 48.0% possessed a certificate, diploma, or post-secondary degree (a lower proportion than in Labrador (52.9%) and the Province (51.9%)). The primary language spoken in households was English, used in 98.5% of households (Statistics Canada, 2023).

In 2021, the economic condition was less favorable in Rigolet than in Labrador as a whole or in the province as a whole. The activity rate was 48,0% compared with 59.1% in Labrador and 47.5% for the entire province. The employment rate was 32.0% which was much less than in the entire Labrador (67.6%) and the entire province (56.1%). The unemployment rate was of 33.3% which was much higher than the rate for the province of Newfoundland and Labrador (15.2%), and higher than the rate for Labrador (12.6%). It was also higher than the rate for the entire Nunatsiavut (29.7%). In 2021, a little more than 16% of jobs in the community was in the primary sector. The rest of the jobs held (almost 85%) were in the tertiary sector. The median household for 2020 was of $73,500 in Rigolet, which was lower than the value for Labrador as a whole ($112,000) but slightly higher than the value for the province as a whole ($71,500) (Statistics Canada, 2023).

15.2.2.10 Sheshatshiu

Sheshatshiu is one of the two Innu communities in Labrador. Its population has grown by 18% between 2016 and 2021, from 671 to 796 inhabitants. In 2021, women were the majority, representing nearly 57% of the population. The average age was 31 years, and 58.8% of the population belonged to the 15-64 age group. Nearly half of the population aged 15 and over (46%) had no diploma, which was more than double the proportion in Labrador (21.2%) and the entire province of Newfoundland and Labrador (20.4%). Furthermore, nearly 26% had only a high school diploma (a similar proportion to Labrador (25.9%) and Newfoundland and Labrador (27.6%)), and 28% had obtained a certificate, diploma, or post-secondary degree (a lower proportion than in Labrador (52.9%) and the overall Newfoundland and Labrador (51.9%)). The Innu language was the most frequently spoken at home, used in 44.6% of households, followed by English (38.2%) (Statistics Canada, 2023).

In 2021, the activity rate in Sheshatshiu was low, reaching only 57.4%. The employment rate was 42%, which was also relatively low. Accordingly, the unemployment rate was very high, standing at 25.8%, representing a quarter of the active population. The median household income was $88,000. The tertiary sector was the most significant employment sector (82% of occupied jobs). Several individuals (130 out of 420 people in the active population) held jobs in the fields of health and social assistance. The primary and secondary sectors were less important sectors of activity, accounting for only 8% and 10% of occupied jobs, respectively (Statistics Canada, 2023).

15.2.2.11 Natuashish

The second Innu community in Labrador, Natuashish, had 856 inhabitants in 2021, a decrease of 8.7% since 2016 (938 inhabitants). In 2021, the average age was 25.5 years, making the population significantly younger than Labrador (38.4 years) and even younger than the overall province of Newfoundland and Labrador (45.5 years). Approximately 59.3% of the population (510 individuals) belonged to the 15-64 age group. Nearly 58% of the population aged 15 and over had no diploma, which was three times higher than in Labrador overall (21.2%) and the entire province of Newfoundland and Labrador (20.4%). Additionally, 14% held only a high school diploma, and 28% possessed a certificate, diploma, or post-secondary degree (a lower proportion than in Labrador (52.9%) and the overall Newfoundland and Labrador (51.9%)). The most spoken language at home was Innu (used in 69% of households), followed by English (15.8%) (Statistics Canada, 2023).

In 2021, the activity rate in Natuashish was 53.5%, and the employment rate was 44.9%. The unemployment rate was 17.5%, and the median household income was $108,000, which was the highest median income among the Labrador communities covered by the proposed project but still lower than the overall Labrador income ($112,000). Almost all (98%) of the occupied jobs in Natuashish were in the tertiary sector, and half of these jobs were related to public administration (Statistics Canada, 2023).

15.3 Human Health, Quality of Life and Psychosocial Impacts

The Ministry of Health and Social Services (MSSS) of Quebec states that the health status of the population is influenced by a set of factors related to both individuals and their physical, economic, political, and sociocultural environments. These factors are also known as "determinants of health" (MSSS, 2022). For Indigenous peoples, including the Inuit, health is a holistic concept that encompasses not only the absence of disease but also the "physical, spiritual, mental, economic, emotional, environmental, social, and cultural well-being of individuals, families, and communities" (Ministry of Health of British Columbia, 2002).

An assessment of risks to human health and the environment was planned in 2013 for the Quest Rare Minerals project. The first step of this study was completed, which involved developing a conceptual model for the entire project, including the mine, a road, a port, and a refining plant. This conceptual model identifies potentially concerning contaminants (including radionuclides), identifies ecological and human receptors potentially exposed to project activities, and identifies exposure pathways for the selected receptors for risk assessment. This conceptual model, based on the Quest Rare Minerals project, will need to be updated according to the planned activities for Torngat Metals as described in this initial project description.

Studies to be carried out:

No study on quality of life and psychosocial impacts had been conducted as part of the Quest Rare Minerals project. A comprehensive study on human health, on quality of life and psychosocial impacts will be conducted as part of the current project.

The first step will be to establish the baseline : using available data, the baseline study will describe the determinants of health using indicators that identify the main characteristics of the environment in which the various components of the Torngat Metals project will be inserted. Various characteristics, and therefore determinants of health, belonging to several fields (individual characteristics, living environments, systems and infrastructure and the overall context) will be documented in the impact study as reference conditions. It should be noted that some of these characteristics have already been discussed in Section 15.2 (Socio-economic Conditions, Local Capacity Analysis, and Workforce Analysis). The characteristics/determinants of health that will be documented transversally during the impact assessment process include, but are not limited to : the health status of the population (overall health, physical health and psychological health); individual characteristics (socio-economic characteristics, lifestyle habits and behaviours, including the consumption of country food where applicable); living environments (family environment, workplace environment, local community); systems and infratructure (health and social services, employment support and social solidarity, housing); and the overall context (socio-economic context, demographic context, environmental context).

The following sections provide a brief health profile and individual characteristics of the different Indigenous and non-Indigenous communities that may be affected by the current project. It is important to note that the data presented in this section are based on an initial review of available literature. The presented information will be supplemented during the impact assessment process to provide a more accurate and updated health determinants portrait. This portrait will at least include all determinants listed in the paragraph above. For instance, among others, the social and health services available and the state of supply and demand for these services will be characterized using the most up-to-date data available. This updating and refinement of data will be carried out through further literature research, as well as meetings and interviews with key informants from the affected communities. Methods will be intersectional (including multiple identity factors) and will be adapted to the concerns and realities of the communities concerned. It is important to emphasize that the list of communities affected by the project is subject to change; additional communities may be added to this list during the study and analysis.

Subsequently, the second step will be to assess impacts on human health, on quality of life and psychosocial impacts. These impacts will be assessed on those aspects of the determinants of health for which concerns will be expressed during Torngat Metals's information and consultation activities. To identify relevant issues and assess the impacts on these issues, concerns, perceptions, and potential consequences (reactions and actions) of the population regarding the project will be documented through interviews and stakeholder engagement programs and subsequently analyzed. This aspect is treated in Section 22 of this document.

It is therefore also important to mention that the health profiles will be presented using GBA Plus, as well as Culturally Relevant Gender Analysis (CRGBA), in the case of Indigenous communities. This will make it possible to assess the health and social effects of the project, both positive and negative, as well as the impacts on Indigenous peoples and other population groups. Women, girls, young people, the elderly and people with different sexual identities experience development projects differently. GBA Plus and CRGBA will therefore help to identify and mitigate the negative effects of the proposed project on these different population groups.

The health and well-being of Indigenous populations in Canada are influenced by a multitude of historical and current sociosanitary determinants resulting from social, economic, political, and geographical issues (Reading & Wein, 2009; King *et al.*, 2009; Phillips, 2019). Generally, the physical and mental health of Indigenous populations is poorer than that of non-Indigenous populations, resulting in shorter life expectancy among Indigenous populations. This situation arises from inequities stemming from social exclusion, discrimination, racism, loss of territory, and loss of sociocultural resources experienced by Indigenous communities. Social determinants of health affect the health of human beings worldwide, and in most countries, minorities and Indigenous peoples have poorer health conditions than other population groups (Adelson, 2005; King *et al.*, 2009; Reading & Wein, 2009; Phillips, 2019).

Although the overall health of Indigenous populations in Canada is improving (Health Canada, 2016), significant differences still exist compared to non-Indigenous populations. For example, as is also the case in other colonized countries, Indigenous populations in Canada have a diabetes rate 3 to 5 times higher than the general population (Horn *et al.*, 2007; Canadian Diabetes Association, 2013).

Diabetes is a serious chronic disease characterized by high blood sugar levels. This disease results from the body's inability to produce sufficient insulin (type 1) or effectively use the insulin produced by the pancreas (type 2). Diabetes can lead to various complications: in the long term, hyperglycemia can damage blood vessels, nerves, and organs such as the kidneys, eyes, and heart, ultimately leading to death. Diabetes is the leading cause of blindness in industrialized countries and is also considered the primary cause of non-traumatic amputations. Type 2 diabetes is more common in individuals who are overweight or obese and in sedentary individuals; it is largely preventable through healthier lifestyles. In Quebec, as elsewhere in Canada, Indigenous populations are particularly affected. The risk of developing diabetes is estimated to be three to five times higher among Indigenous people than in the overall Canadian population (Therriault Y. *et al.*, 2018). Thus, while type 2 diabetes and obesity are major health issues for all Canadians, they are even more significant for several Indigenous communities in the country (Khayyhat Kholghi *et al.*, 2017; Young *et al.*, 2000).

Furthermore, in Canada, suicide rates among First Nations, Metis, and Inuit populations remain higher than those observed in the non-Indigenous population. However, suicide rates vary depending on the community, Indigenous group, age group, and sex. In 2011-2016, suicide rates among First Nations, Metis, and Inuit were significantly higher than those among the non-Indigenous population: the suicide rate among First Nations (24.3 deaths per 100,000 person-years at risk) was three times higher than that of the non-Indigenous population (8.0 deaths per 100,000 person-years at risk) (Kumar M. B. and Tjepkema M., 2019).

15.3.1 Quebec

15.3.1.1 Nunavik Inuit

In the Arctic, Inuit inhabit Inuit Nunangat (the Inuit homeland) and its four constituent regions. Inuit thus inhabit Nunavik (northern Quebec), Nunatsiavut (northern Labrador), Nunavut as well as the Inuvialuit region of the Northwest Territories (Statistics Canada, 2015).

Nunavik is a vast territory located north of the 55th parallel, with approximately 12,000 inhabitants. Nunavik Inuit are distributed among 14 villages, ranging in size from 100 to 2,700 residents. The largest community is Kuujjuaq. These villages, located several hundred kilometers apart, are situated along the coastlines of Hudson Bay, Hudson Strait, and Ungava Bay (where the communities of Kuujjuaq and Kangiqsualujjuaq are located). Around a hundred Inuit live in Chisasibi, a Cree village in James Bay (Government of Quebec, 2023a).

In general, the overall health and well-being levels of the Inuit are lower than those of the general population in Canada (Chief Public Health Officer, 2008). Indicators of this health disparity include lower levels of self-rated health, both general and mental, as excellent or very good (Wallace, 2014; Gionet and Roshanafshar, 2013; Tait, 2008; Gionet and Roshanafshar, 2013). Inuit are more likely to report respiratory disorders such as asthma (Gionet and Roshanafshar, 2013) and tuberculosis compared to the non-Indigenous population in Canada (Public Health Agency of Canada, 2015). Additionally, Inuit have a shorter life expectancy and higher infant mortality rates compared to the overall Canadian population (Wilkins *et al.*, 2008) (Statistics Canada, 2016a).

Age Groups

As discussed in Section 15.2 "Socio-economic Context," the population of Nunavik is relatively young: over a third (34%) of the residents are under 15 years old. This proportion is almost twice as high as in the entire province of Quebec (16%).

The proportion of elderly individuals (65 years and older) is lower in Nunavik compared to other parts of the province, but it is expected to increase in the future. Therefore, it will be necessary to adjust services to meet the specific needs of the elderly population in the region (RRSSN and INSPQ, 2015).

Well-being and Personal Resources

Self-rated health or perceived health

Self-rated health (or perceived health) is a general measure of well-being that has been established as a reliable and valid indicator of the population's health status, as well as its relationship with specific dimensions such as mortality and healthcare utilization, in several studies (Burström and Fredlund, 2001; DeSalvo, Bloser, Reynolds, He, and Muntner, 2005; Rohrer, Arif, Denison, Young, and Adamson, 2007; Camirand *et al.*, 2009).

According to the 2012 Aboriginal Peoples Survey (APS) (Statistics Canada, 2015), 37% of Inuit in Nunavik perceived their health as "excellent" or "very good," while the rate for all Inuit in Canada was 45%. The rate for Inuit in Nunavik was the lowest among all regions in Quebec and lower than the Quebec average, where 59% of the population reported excellent or very good health. For the whole of Canada, this proportion was slightly higher at 63% (Canadian Community Health Survey, 2012).

Self-esteem, pride, and psychological distress

In general, the majority of Nunavimmiut have a positive self-esteem (80% have normal or high self-esteem), take pride in their culture (90%), and almost three-quarters are satisfied or very satisfied with their lives, with higher proportions among the elderly.

However, psychological distress is prevalent, especially among young people, as evidenced by high rates of alcohol and drug abuse, violence, and suicide. Among all rural regions in the province of Quebec, Nunavik has the highest rates of injuries. Young males are the most affected population, and the main causes of injuries are road accidents (cars, trucks, ATVs, or snowmobiles), where alcohol consumption is a significant factor (RRSSN and INSPQ, 2015).

Health-influencing Behaviors

Tobacco

The health risks associated with tobacco use include heart disease, mouth and lung cancer, emphysema, and bronchitis (Health Canada, 2023). In 2012, 16% of the total population aged 15 and older in Canada smoked daily (Canadian Community Health Survey, 2012). According to the 2012 APS, half (52%) of Inuit aged 15 and older smoked cigarettes daily, with the percentage rising to 67% among Nunavimmiut, which is the highest rate among the four Inuit regions.

Alcohol

Abusive alcohol[22] consumption is linked to health and social problems, including cancer, liver cirrhosis, fetal alcohol spectrum disorders, motor vehicle accidents, alcohol poisoning, family disruptions, crime, and violence (Health Canada, 2021).

In 2012, one-third of Nunavimmiut (34%) reported abusive alcohol consumption, while the figure was 26% for all Inuit aged 15 and older (30% for men and 23% for women), accounting for approximately a quarter of them. In the same year, 18% of the total population aged 15 and older in Canada reported abusive alcohol consumption (Canadian Community Health Survey, 2012).

[22] Five or more drinks on one occasion, at least once a month (Statistics Canada, 2013a)

Health Problems

Prevalence of obesity

Obesity is associated with chronic health problems such as type 2 diabetes, hypertension, cardiovascular diseases, gallbladder diseases, and certain types of cancer (Navaneelan and Janz, 2014). In Nunavik, as in industrialized countries in general, dietary and lifestyle changes have resulted in an increase in the obesity rate. In 2004, 30% of adults were overweight, and 28% suffered from obesity, with the 50 to 74 age group being the most affected. This represents a significant increase since, in 1992, 21% of Nunavimmiut were overweight and 19% were obese (RRSSN and INSPQ, 2015).

Chronic Health Problems

The APS defined a "chronic health problem" as a long-term problem that is expected to last or has already lasted for at least six months and has been diagnosed by a healthcare professional. In 2012, 31% of Inuit in Nunavik reported at least one chronic health problem, and this figure was 43% for all Inuit (47% for women and 39% for men) (Statistics Canada, 2015).

The most commonly reported chronic health problems among Inuit in Nunavik were hypertension (9% compared to 12% for all Inuit), arthritis (5% compared to 12% for all Inuit), asthma (4% compared to 7% for all Inuit), and mood disorders (5% compared to 7% for all Inuit), such as depression or bipolar disorder. Diabetes (excluding gestational diabetes) was reported by 2% of Inuit in Nunavik (and 5% of all Inuit). The vast majority of all diabetes cases (including gestational diabetes) were type 2 diabetes. For the total population of Canada, the respective figures were 4% for hypertension, 10% for arthritis, 8% for asthma, 8% for mood disorders, and 4% for diabetes (Statistics Canada, 2015).

Among Inuit, diabetes is not yet as prevalent as in some other Indigenous nations. The hypothesis that Inuit benefit from genetic protection against diabetes has been refuted by research. The low incidence of diabetes among Inuit is instead attributed to the maintenance of a relatively active lifestyle and a traditional diet until very recently. However, several experts state that the decline in the traditional diet and the increasing sedentary lifestyle will contribute to increasing obesity and diabetes rates in the medium and long term. These predictions are also based on the increasing rates of metabolic syndromes within these populations (Dewailly, Chateau-Degat *et al.*, 2007) (RRSSN and INSPQ, 2015).

Cardiovascular diseases are the most prevalent type of chronic diseases in the Nunavik region, and their rates are higher than the Quebec average. Just like with diabetes, the initial hypothesis that Inuit were protected against cardiovascular diseases has been refuted. It is rather the high content of omega-3 fatty acids in the traditional food that has so far reduced the risk of heart diseases in this population. Researchers also link the reduction in traditional food among young Inuit to the parallel increase in cardiovascular diseases (Dewailly, Blanchet *et al.*, 2001) (RRSSN and INSPQ, 2015).

In the future, similar to diabetes, the incidence rate of cardiovascular diseases is still likely to increase due to the abandonment of traditional diet and lifestyle, as well as smoking (RRSSN and INSPQ, 2015).

Chronic diseases mainly affect adult Inuit, although they are increasingly appearing earlier in life (RRSSN and INSPQ, 2015).

Food Insecurity

Food security exists "when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (Food and Agriculture Organisation, 1996). The absence of food security (food insecurity) is a factor that contributes to poor health, as it is associated with limited mobility, multiple chronic health problems, and experiencing major depression and distress (Tarasuk, 2009). Accessing healthy food in northern regions is much more costly than in southern Canada, and food insecurity is a well-known problem among the Inuit (Rosol, Huet, Wood, Lennie, Osborne, & Egeland, 2011).

In 2012, 41% of Inuit aged 15 and older lived in households that experienced food insecurity in the past 12 months. In Nunavik, this rate was 55%, while for the total population of Canada, the rate was 8%.

Hospitalizations and Deaths

The cancer hospitalization rate in Nunavik is similar to the overall rate in the province of Quebec, except for lung cancer, which significantly exceeds the provincial average, likely due to the high smoking rate in Nunavik.

Respiratory diseases account for one in four deaths among the elderly, and respiratory failure is the leading cause of hospitalization in Nunavik, which is undoubtedly related to high smoking rates and overcrowded housing.

The second leading cause of hospitalization in the region is digestive system disorders, a higher position than in the rest of Quebec. Gastroenteritis is likely also attributable to overcrowded housing and the consumption of contaminated water or food (RRSSN and INSPQ, 2015).

Life Expectancy at Birth

Regarding life expectancy at birth, as reported in the "Portrait of Nunavik Health - The Health of Youth, Adults, and the Elderly" (RRSSN and INSPQ, 2015), there is a gap between the life expectancy of Nunavimmiut and that of other Quebecers. For Inuit in Nunavik, life expectancy is 65 years for men and 69 years for women, while in Quebec as a whole, these respective figures are 79 years and 84 years, representing a difference of about fifteen years. A gap is also observed with the James Bay Cree, where life expectancy for men and women is 75 years and 82 years, respectively. Among the four Inuit regions in Canada, Nunavik has the shortest life expectancy (MSSS, 2010).

This gap can be explained by several health problems. For men, suicides, at 37%, rank first and account for over a third of the gap. They are followed by unintentional injuries (trauma) at 19%. For women, the leading causes of mortality are cancer and respiratory diseases (24%), also followed by unintentional injuries. Suicide and injuries mainly affect teenagers and young adults, while cancer and respiratory diseases primarily affect older individuals (RRSSN and INSPQ, 2015).

Regarding suicide specifically, the number of cases tripled in Nunavik, from 11 cases in 2015 to 35 cases in 2019. The suicide rate is the highest in the province, with a rate of 177.1 per 100,000 people (13.1 per 100,000 people in Quebec as a whole) (Levesque, Rassy, & Genest, 2022 in MSSS, 2022). The difficulties in accessing specialized care and services, recruitment and retention issues for human resources, the ongoing impacts of colonization, socio-economic difficulties, culturally and linguistically inappropriate practices are some of the factors that may explain the rates in Nunavik (MSSS, 2022).

In 2015, the authors of the "Portrait of Nunavik Health - The Health of Youth, Adults, and the Elderly" conducted by the Nunavik Regional Board of Health and Social Services in collaboration with the National Institute of Public Health of Quebec noted that many of the observed issues are attributable to the abandonment of traditional ways of life, as well as the increase in smoking, substance abuse, and psychological distress. The authors emphasize that interventions aimed at changing these behaviors are unlikely to be successful if the social, cultural, and economic factors underlying these difficulties are also not taken into account. They also mention that concrete measures are necessary to improve access to housing, employment, and culturally adapted health services, as well as addressing the collective consequences of intergenerational trauma, thus enabling long-term improvements in the health and well-being of Nunavimmiut.

It should be noted that a national survey on Inuit health called "Qanuippitaa?" is currently underway (2023). It is the first national program of its kind to be fully led by Inuit from across Inuit Nunangat.

15.3.1.2 Naskapi Nation of Kawawachikamach

In Quebec, the Naskapi Nation has approximately 1,450 people (Government of Quebec, 2023b). About 641 of them were based in the sole Naskapi village in Quebec, Kawawachikamach, located in northern Quebec, about 15 kilometers from Schefferville, according to the 2021 Census of Population (Statistics Canada, 2023).

The sedentarization of the Naskapi people has been accompanied by various health problems previously unknown to this community (Nematau Innu, 2010 in Hémond, 2012). Among these is diabetes: 28% of the population is affected by type 2 diabetes, which can be caused by genetic predisposition, excess weight, or lack of physical activity (Diabète Québec, 2009; Nation of Kawawachikamach, 2011b in Hémond, 2012).

In the year 2000, the Naskapi community expressed the desire to manage its healthcare system to meet its specific needs according to their culture and identity. Negotiations with the government of Quebec led to the creation of the Naskapi CLSC[23] (Local Community Service Center) managed by the community (Hémond, 2012).

Available data on the health of the Naskapi people are addressed in Section 15.3.1.5, within the geographical framework of the local service network (RLS[24]) of Kawawachikamach (Naskapi CLSC). This RLS is part of the Caniapiscau Regional County Municipality (MRC), which includes two RLS territories: the Caniapiscau RLS and the Kawawachikamach RLS (Naskapi CLSC).

15.3.1.3 Quebec Innu (Matimekush - Lac John and Uashat mak Mani-Utenam communities)

In Quebec, the Innu Nation has over 16,000 people, making it the third most populous Indigenous nation in the province, following the Mohawk and Cree nations. Seven out of the nine Innu communities in Quebec are located along the north coast of the St. Lawrence River (Essipit, Pessamit, Uashat mak Mani-Utenam, Ekuanitshit, Nutashkan, Unamen-shipu, and Pakua-shipi. Another community, Mashteuiatsh, is situated near Lac-Saint-Jean, while the Matimekush–Lac John community is adjacent to Schefferville (Government of Quebec, 2023c).

The Uashat mak Mani-Utenam community is located in two sites: Uashat, bordering the city of Sept-Îles, and Mani-Utenam (Maliotenam), which is about 14 km further east. The available health data for the Uashat mak Mani-Utenam community are also addressed in Section 15.3.1.5, along with the available health data for the Innu of Matimekush–Lac John. The latter is addressed within the geographical framework of the Caniapiscau local service network (RLS). As mentioned earlier, the Caniapiscau Regional County Municipality (MRC) indeed includes two RLS territories: the Caniapiscau RLS and the Kawawachikamach RLS (Naskapi CLSC). The Caniapiscau RLS comprises the municipalities of Fermont and Schefferville, as well as the Innu community of Matimekush-Lac-John.

15.3.1.4 Non-Indigenous Communities: Sept-Îles, Fermont, and Schefferville

The city of Sept-Îles is located in the Sept-Rivières Regional County Municipality (MRC) in the Côte-Nord administrative region of Quebec. The expansive territory of the Caniapiscau MRC is also situated in the Côte-Nord region. This MRC's territory encompasses the cities of Fermont and Schefferville, as well as the Innu community of Matimekush-Lac John, and the Naskapi community of Kawawachikamach.

As previously mentioned, the Caniapiscau MRC includes two local service network (RLS) territories: the Caniapiscau RLS and the Kawawachikamach RLS (Naskapi CLSC). The Caniapiscau RLS comprises the municipalities of Fermont and Schefferville, as well as the Innu community of Matimekush-Lac-John.

The available health data for the non-Indigenous populations of the Côte-Nord region are also addressed in Section 15.3.1.5.

15.3.1.5 Health Data on Naskapi, Innu, and Non-Indigenous Communities in Quebec Affected by the Project

This section highlights certain available health data for the Côte-Nord region, the Caniapiscau RLS, and the Kawawachikamach RLS (Naskapi CLSC), as well as for the entire province of Quebec. These data are explained and supplemented with specific elements in the following text, particularly for the Innu community of Uashat mak Mani-Utenam.

[23] Centre local de services communautaires
[24] Réseau local de services

These data are derived from an initial overview of the available literature. They will be further complemented during the impact study to provide a more precise and up-to-date health profile of the communities affected by the project. This updating and refinement of the data will occur through further literature research, as well as through meetings and interviews with stakeholders from the concerned communities. It is important to note that the list of communities affected by the project is subject to change; other communities may be added to this list during the study and analysis.

Much of the data comes from the document *« Portrait de santé et de bien-être de la population nord-côtière »* (Therriault Y. et al., 2018) which presents data for the Côte-Nord region, the Caniapiscau RLS, and the Kawawachikamach RLS (Naskapi CLSC) when available, as well as for the entire province of Quebec. For this reason, this section is entitled "Health data on Naskapi, Innu and non-Indigenous communities in Quebec affected by the project". However, this does not mean that the data will be presented jointly for these Indigenous and non-Indigenous communities in the Impact Assessment report. Of course, the data for the Innu, Naskapi and non-Indigenous communities will be presented and analyzed separately for each of the communities concerned. This is also the case in the following paragraphs, where a distinction is made whenever necessary.

Well-being and Personal Resources

Self-reported Health or Perceived Health

In 2011-2012, nearly 52% of Côte-Nord region residents perceived their health as "excellent" or "very good," a lower rate compared to the overall rate in Quebec (around 60%). Regarding mental health, nearly 73% of Côte-Nord region residents considered their mental health to be "excellent" or "very good," which is comparable to the rest of Quebec (75%). In 2014-2015, approximately 12% of the population aged 15 and above in the Côte-Nord region perceived their health as "fair" or "poor," a higher proportion than the rest of Quebec (around 10%). However, in the Caniapiscau local service network (RLS) territory, this perception was much less prevalent, as only 6.2% of residents perceived their health as "fair" or "poor" (Therriault Y. *et al.*, 2018).

Sense of Belonging to the Local Community

In 2011-2012, the vast majority of Côte-Nord region residents aged 15 and above (94.5%) reported being satisfied with their social life, a proportion similar to that in the overall Quebec population (Therriault Y. *et al.*, 2018). The region is characterized by a strong sense of belonging, with 78% of Côte-Nord region residents having a very strong or somewhat strong sense of belonging to their local community, a significantly higher proportion than the rest of Quebec (57%).

Health Influencing Behaviors

The lifestyle habits of Côte-Nord region residents indicate a similar rate of excessive alcohol consumption compared to the rest of the province, but higher rates of smoking, overweight, and obesity are observed in the Côte-Nord region.

Tobacco

In 2014-2015, just under a quarter (23%) of Côte-Nord region residents aged 15 and above smoked cigarettes on a daily or occasional basis, which was higher than the proportion observed in Quebec (19%). In the Caniapiscau RLS, the smoking rate was approximately 22%, the lowest proportion among the RLSs in the Côte-Nord region (Therriault Y. *et al.*, 2018).

Alcohol

In 2010, over a quarter (28%) of the adult population in the Côte-Nord region displayed patterns of excessive alcohol consumption. In the local service network territories (RLSs), the percentage of adults with excessive alcohol consumption ranged from 24% (Basse-Côte-Nord RLS) to nearly 39% (Caniapiscau RLS). The Caniapiscau RLS was the only RLS that showed significantly higher rates of alcohol consumption compared to the rest of the Côte-Nord region (Therriault Y. *et al.*, 2018).

Health Issues

The health status of the population in the Côte-Nord region exhibits some disparities compared to the overall Quebec population. Indeed, the vast majority of indicators related to disease prevalence rates (diabetes, lung cancer) or mortality rates (cancers, circulatory system diseases, respiratory system diseases, accidental injuries, suicides, and self-inflicted injuries) are higher than those in Quebec.

Prevalence of Obesity

In the Caniapiscau RLS (24%) and the Côte-Nord region (26%), there is a higher proportion of obese individuals compared to the rest of the province of Quebec, where the proportion is 19% (Therriault Y. *et al.*, 2018).

Diabetes

In 2014-2015, approximately 10% of the population in the Côte-Nord region, aged 20 and above, were living with diabetes, a higher proportion of diabetic individuals than the overall rate in Quebec (8%). With the exception of Port-Cartier (8.1%), the local service network territories (RLSs) in the Côte-Nord region had higher proportions of diabetic individuals than the prevailing rates for the rest of Quebec. Furthermore, the Naskapi CLSC, with 23.5% of diabetic individuals, had by far the highest proportion of diabetics among the eight RLSs in the Côte-Nord region. The Caniapiscau RLS had a rate of 10.9% (Therriault Y. *et al.*, 2018).

In 2014-2015, in proportion, diabetes and hypertension were more prevalent chronic diseases among men and women in the Côte-Nord region. The higher proportion of sugary drink consumption among Côte-Nord region residents compared to the overall rate in Quebec constituted a significant risk factor (Therriault Y. *et al.*, 2018).

Lung Cancer

The Côte-Nord region has a higher proportion of individuals affected by lung cancer compared to the prevailing rate in the province of Quebec, with approximately 2 out of 1,000 people (CISSSCN, 2018).

Uashat mak Mani-Utenam: Huntington's Disease

The 2018-2023 health plan for Uashat mak Mani-Utenam highlighted that the community is the second epicenter of Huntington's disease[25] in the world, affecting 1 person out of 190 (Innu Takuaikan Uashat Mak Mani-Utenam, 2017).

Deaths

Life Expectancy at Birth

In the Côte-Nord region, life expectancy at birth is proportionally lower than the rest of Quebec. In 2010-2012, life expectancy was 82.9 years for Côte-Nord region women compared to 83.7 years for women across Quebec, and 80.4 years for Côte-Nord region men compared to 81.7 years for men across Quebec.

For the Caniapiscau RLS territory, the life expectancy at birth, for both sexes combined, was 77.5 years for the period 2008-2012, which was the shortest life expectancy among seven of the eight RLSs in the Côte-Nord region. Note that data for the 8th RLS, the Naskapi CLSC, was not published (Therriault Y. *et al.*, 2018).

[25] Huntington's disease is an inherited disorder that causes certain nerve cells in the brain to die. People are born with the gene that causes the disease, but symptoms usually do not appear until mid-adulthood (Alzheimer Society, 2023).

Mortality

For the period 2008-2012, the mortality rate for the Côte-Nord region for all causes was 800 per 100,000 people (754 per 100,000 people for the rest of Quebec). The Côte-Nord region residents were proportionally more likely to die from all types of cancers and lung cancer than the rest of the Quebec population, particularly due to smoking patterns in the 1980s-1990s (Therriault Y. *et al.*, 2018).

Among the causes of death, the Côte-Nord region had higher rates than the rest of Quebec for several causes, including cancers, respiratory system diseases, accidental injuries, suicides, and self-inflicted injuries.

Among the territories of the 8 RLSs in the Côte-Nord region, the Naskapi CLSC had the highest adjusted mortality rate, with 1,394.2 per 100,000 people, which is a significantly higher mortality rate than the rest of the Côte-Nord region. The Caniapiscau RLS territory also had a higher rate than that of the Côte-Nord region, with 991.2 per 100,000 people (Therriault Y. *et al.*, 2018). The main causes of death on this territory were cancer (24%), heart diseases (12%), unintentional injuries (12%), diabetes (7%), and lower respiratory tract diseases (7%) (CISSCN, 2018).

Regarding specific Indigenous communities, the Uashat mak Mani-Utenam community has faced multiple suicides in recent years, especially in 2015, where 5 members took their own lives within nine months. A coroner's investigation took place, and the report was published in 2016. It noted that between 1994 and 2015, 44 people died by suicide in Uashat mak Mani-Utenam, with a total population of approximately 3,400 residents (Bureau du Coroner du Québec, 2017).

As mentioned at the beginning of the section, in Canada, suicide rates among First Nations, Metis, and Inuit populations are consistently higher than those observed in the non-Indigenous population, with variations based on community, Indigenous group, age group, and gender (Kumar M. B. and Tjepkema M. 2019).

15.3.2 Labrador

This section presents certain available health data for the Labrador-Grenfell Health region[26], specific communities, as well as for the entire province of Newfoundland and Labrador.

As mentioned for the communities in Quebec, this data is derived from an initial overview of available literature. Currently, the data is partial and will be supplemented during the impact study to provide a more precise and updated health profile of the communities affected by the project. This updating and refinement of data will be done through further literature research as well as through meetings and interviews with stakeholders from the concerned communities. It is important to note that the list of communities affected by the project is evolving, and other communities may be added to this list during the study and analysis.

15.3.2.1 Nunatsiavut Inuit (communities of Nain, Hopedale and Makkovik)

Nunatsiavut (which means "our beautiful land" in Inuktitut) is located in the northern part of the Labrador Peninsula. Approximately 2,300 Inuit people, known as Nunatsiavummiut (a term meaning "people of Nunatsiavut" in Inuktitut), live along the Labrador coast, mainly in five communities. Nain, with a population of 1,100 residents, is the largest Inuit community in Labrador and serves as the administrative center, while Hopedale is the legislative capital (Inuit Tapiriit Kanatami, 2023).

[26] The Labrador-Grenfell Regional Health Authority is one of the five health zones in Newfoundland and Labrador, covering Labrador and all communities north of Bartlett's Harbour on the Northern Peninsula. Within this zone, health and community services are provided to approximately 37,000 people (Statistics Canada, 2016 Census data), including three Indigenous groups: Innu, Inuit, and Southern Inuit (Inuit-Metis or Metis of Labrador). However, it should be noted that as of April 1, 2023, all regional health authorities and the Newfoundland and Labrador Centre for Health Information are transitioning to a single provincial health authority (Labrador-Grenfell Health, 2023). The geographic divisions, however, are retained for the purpose of data presentation.

Hunting and fishing continue to dominate the Inuit's diet and the regional economy. The government and service industries are the main employers in Nunatsiavut, but the Voisey's Bay nickel mine is expected to boost the local economy in the coming years by employing Inuit individuals from neighboring regions (Inuit Tapiriit Kanatami, 2023).

As mentioned in the section on Inuit in Nunavik, it is worth noting that a national health survey for Inuit, Qanuippitaa, is currently underway (2023). It is the first national program of its kind to be entirely led by Inuit from across Inuit Nunangat.

Self-Reported or Perceived Health

According to the 2012 Aboriginal Peoples Survey (APS) (Statistics Canada, 2015), 50% of Inuit in Nunatsiavut perceived their health as "excellent" or "very good," compared to 45% for all Inuit and 63% for the total population of Canada. It should be noted that this proportion was lower among Inuit in Nunavik, where 37% perceived their health as "excellent" or "very good" (Statistics Canada, Canadian Community Health Survey, 2012).

Regarding mental health, in 2011-2012, a higher proportion of people (78.2%) in the Labrador-Grenfell Health region perceived their mental health as "excellent" or "very good" compared to the overall province (73.2%) (Statistics Canada, 2015)[27].

The sense of belonging to the local community in 2011-2012 approached 90% for the Labrador-Grenfell Health region as a whole and 77% for the province. Around 93% of people reported being satisfied or very satisfied with life in the Labrador-Grenfell Health region as a whole and in the province (in both cases).

Health Issues

Prevalence of Obesity

In 2011-2014, in the Labrador-Grenfell Health region and the province as a whole, approximately two-thirds of residents were overweight or obese (69% and 66%, respectively).

Diabetes

In 2011-2012, diabetes affected just under 10% of the population in the province of Newfoundland and Labrador.

Health-Influencing Behaviors

Tobacco

According to the 2012 APS (Statistics Canada, 2015), half (50%) of Inuit aged 15 and older in Nunatsiavut smoked cigarettes daily, which was a lower daily usage rate compared to the overall Inuit Nunangat (52%). Nunatsiavut was the only Inuit region out of the four that had a lower daily tobacco usage rate than the overall Inuit Nunangat. It should be noted that the rates were 67% for Nunavimmiut and 16% for the total population of Canada (Canadian Community Health Survey, 2012).

Alcohol

In 2012, nearly half (47%) of Inuit in Nunatsiavut reported alcohol abuse, while the figure was 26% for all Inuit aged 15 and older (30% for men and 23% for women), representing approximately one-quarter of them. In the same year, 34% of Inuit in Nunavik and 18% of the total Canadian population aged 15 and older indicated alcohol abuse (Canadian Community Health Survey, 2012).

[27] It should be noted that the exercise has some limitations, as different time periods are sometimes compared. However, this comparison appears to be acceptable in the context of the current exercise, which is to draw a summary portrait of the health context.

Food Insecurity

In 2012, 41% of Inuit aged 15 and older lived in households that experienced food insecurity in the past 12 months. In Nunatsiavut, this rate was 45%. It should be noted that the rate was 55% in Nunavik and 8% in the total Canadian population.

15.3.2.2 Labrador Innu (Sheshatshiu and Natuashish communities)

The Labrador Innu population consists of approximately 2,200 individuals, the majority of whom live in the two communities of Sheshatshiu and Natuashish.

It is generally accepted that the Labrador Innu's forced transformation from nomadic hunters to sedentary residents within the space of a generation is the starting point for most of the Innu's social and health ills (Backhouse, C. & McRae, D., 2002; McRae, D.M., 1993). This sudden shift in the Innu way of life led to profound changes where Innu self-sufficiency was replaced by dependence on government services, traditional food by groceries and activity by lethargy (Innu of Sheshatshiu and Natuashish, 2014).

In addition, the lack of resources to address all aspects of health in their communities, and the great distance separating them from services that could be offered in greater numbers have also had a direct impact on Labrador Innu health, particularly mental health and addiction issues (Celeste McKay Consulting Inc. and McRae D., 2021).

The social and health ills of the Labrador Innu are reflected in the problems affecting individuals and families in Sheshatshiu and Natuashish today. According to the Canadian Human Rights Commission's follow-up report on the human rights of the Labrador Innu (Celeste McKay Consulting Inc. and McRae D., 2021), members of this Indigenous group are facing a significant health crisis. The average age of death among them is much younger than the average age of death in Newfoundland and Labrador, and the high infant mortality rate is an important factor in the very low average age of death. For the two Labrador Innu communities, the mortality rate is about three times higher than the average rate for all First Nations in Canada. Another important factor is the high and persistent suicide rate in Sheshatshiu and Natuashish (Celeste McKay Consulting Inc. and McRae D., 2021). More specifically, data from two reports (Health Needs Assessment (FNIHB, 2012) and Labrador Innu Comprehensive Healing Strategy Impact Assessment (INAC, 2009)) presented below illustrate the health and social issues affecting both communities :

- Prenatal use of drugs, alcohol and solvents was 4 to 6 times higher than that reported in the general Canadian population (2008-2009 data in FNIHB, 2012);
- Prenatal smoking are 5 to 6 times higher than in the general Canadian population (FNIHB, 2012) ;
- Oral health scores are significantly lower (3 times in Shetashtshit and 5 times in Natuashish) than those of the general Canadian population (FNIHB, 2012);
- The suicide rate is 75.7 per 100,000 population in Sheshatshiu and in 164.1 per 100,000 population in Natuashish, which contrasts with the Canadian general population data of 11.0 per 100,000 population (FNIHB, 2012) ;
- The average age at death is 48 in Sheshastshsiu and 47 in the Natuashish, while the Newfoundland and Labrador average is 74 (FNIHB, 2012) ;
- The violent crime rate in 2010 was 31.31 per 100 people in Sheshatshiu and was 23.69 per 100 people in Natuashish, while the general Canadian population rate is 1.28 per 100 (FNIHB, 2012).
- The average infant mortality rate among First Nations in Canada is 6.4 per 1,000 live births, while the average rate is 17.8 per 1,000 live births in Sheshatshiu and 18.7 per 1,000 live births in Natuashish (INAC, 2009).
- Members both communities have identified the following needs that are not adequately met by existing healing programs: Addictions; lack of infrastructure; limited training and mentoring; recreation programs for children and youth; education and post-secondary initiatives; teen pregnancy; lack of access to healthy food; abuse; justice issues (INAC, 2009).

In October 2019, the population of Sheshatshiu experienced a suicide crisis with ten suicide attempts in one week, following numerous deaths from natural causes. This tragedy is part of a crisis that has been going on for decades. According to a study published in the American Journal of Public Health, of the 128 deaths by suicide in Labrador (and 617 in the province as a whole) between 1992 and 2009, 28 occurred in Labrador's two Innu communities. Overall, the study found that the suicide rate in Labrador was almost three times higher than in Canada as a whole, but that the rate was ten times higher in the Innu communities than nationally. The Innu report that the incidence of suicide remains disproportionately high, despite a decline in the number of suicides since the community left Davis Inlet (Celeste McKay Consulting Inc. and McRae D., 2021).

The secretariat of the Innu Round Table, which coordinates prevention services in the two Innu communities of Labrador, has highlighted the seriousness of a number of other community problems, such as drug and/or alcohol abuse. Over a four-year period, a third of the people admitted to the emergency department of the Labrador Health Centre were Innu. Almost half of the emergency room visits were alcohol-related and one third were drug-related. Of those admitted to the health centre, one in five had attempted suicide. The Natuashish band council has banned alcohol on its territory, but this measure remains very difficult to enforce.

Further research and interviews conducted as part of the impact assessment process will help to characterize and refine the health profile of in Sheshatshiu and Natuashish.

15.3.2.3 Non-Indigenous Communities: Happy Valley-Goose Bay and Northwest River

The town of Happy Valley-Goose Bay is located in the central part of Labrador. With a population of approximately 8,000, it is the most populous urban center in the region. Incorporated in 1973, the municipality includes the former town of Happy Valley and the district of Goose Bay.

Northwest River, also situated in the central part of Labrador, is a small town with a population of 560 in 2021. It faces the Innu community of Sheshatshiu, with a bridge connecting Northwest River to Sheshatshiu and the mainland. No specific and/or usable data on the health of the residents of Northwest River could be found during this preliminary work. Further research and interviews during the impact study will help characterize the health profile of this locality.

Well-being and personal resources

Self-reported or perceived health

In 2011-2012, nearly 52% of the residents of Happy Valley-Goose Bay perceived their health as "excellent" or "very good," a lower rate compared to the overall Newfoundland and Labrador (60%) and the Labrador-Grenfell Health region as a whole (64.7%).

Health Issues

Prevalence of Obesity

In 2015-2016, almost three-quarters of the residents of Happy Valley-Goose Bay (74.1%) were overweight or obese, higher than the prevalence in the Labrador-Grenfell Health region as a whole (69%) and the province as a whole (66%) in 2011-2012, where these proportions are also high.

Diabetes

In 2014-2015, 9.1% of the population of Happy Valley-Goose Bay lived with diabetes, a similar proportion to the overall Newfoundland and Labrador (9.4%) in 2011-2012. However, in the Labrador-Grenfell Health region, this proportion was slightly lower (8.3%).

Health-Influencing Behaviors

Tobacco

In 2015-2016, a quarter (25%) of the residents of Happy Valley-Goose Bay smoked cigarettes daily or occasionally, slightly higher than the proportion observed in the province as a whole in 2011-2012 (23.2%), but lower than the prevalence in the Labrador-Grenfell Health region (29.2%).

Alcohol

In 2015-2016, over 40% (41.1%) of the adult population in Happy Valley-Goose Bay displayed alcohol abuse, similar to the rate observed in Nunatsiavut (47%). In the province and the Labrador-Grenfell Health region, these rates were around a quarter of the population (26.8% and 28.1%, respectively).

Deaths

Regarding deaths, no directly specific figures for the communities involved whether Indigenous or allochthonous, could be documented during this initial overview. However, data from the Labrador-Grenfell Health region and the province of Newfoundland and Labrador show that life expectancy was similar between these two entities, both for the general population (around 78 years) and for women (around 80 years) and men (around 76 years). Furthermore, the rates of death caused by accidental injuries, suicides, or self-inflicted injuries were proportionally higher in the Labrador-Grenfell Health region than in the province of Newfoundland and Labrador. In fact, in 2005-2007, these figures were respectively 37% for the Labrador-Grenfell Health region compared to 21.9% for the province of Newfoundland and Labrador, and 28% for the Labrador-Grenfell Health region compared to 9.7% for the province of Newfoundland and Labrador.

15.4 Archaeology

15.4.1 Mine Site and Surroundings

Two archaeological inventories were conducted at the proposed mining site in 2011 and 2012 as part of the Quest Rare Minerals project (AECOM, 2013i). A cache dating back to the Maritime Archaic period was found at an elevation of 508 meters above current sea level, potentially on the shores of the former glacial lake Naskaupi. This small pile of stones was located at the boundary of the B-Zone mineral deposit, approximately 500 meters from the shore and 63 meters above the level of Lake Brisson (site HbDb-b). It was anticipated that this structure could be affected by the final phase of the proposed mining plan for the project.

Three concentrations of anthropogenic quartz flakes and a concentration of burned bone fragments were also found on the surface within an area of 100 square meters. This site (HbDb-3) was located 7 meters above the level of Lake Brisson, approximately a little over 50 meters from the helipad used at the exploration camp, and less than 100 meters from the lake. Another site with several stone flakes was discovered near Lake Brisson, at the end of the airstrip at the exploration camp. These two sites were not dated (HbDa-1).

Studies to be carried out:

Further work will be necessary to ensure that the new configuration of the mining site does not affect any potential archaeological resources. Therefore, an archaeological reassessment will be carried out, which may lead to an on-site archaeological inventory in 2024 and, if necessary, in 2025. Additionally, an archaeological excavation will be required at the HbDb-b site identified in 2012-2013 within the B-Zone mineral deposit at the mining site.

15.4.2 Road Corridor, Container Handling and Storage Facilities, Port Facilities

Several known archaeological sites are located near or within the corridor identified in 2011-2013 for the construction of a road, and in the area identified for the implementation of the handling and storage facilities in Edwards Cove (Option A), including:

- HbCv-01, HbCv-06 et HbCv-07 north of the Kogaluk River;
- HcCo-01, HcCo-02, HcCo-03, HcCo-01, HcCo-05 et HbCm-02 along the Ikadlivik Brook;
- HcCm-20, HcCm-21, HcCm-22, HcCm-23, HcCm-24, HcCm-26 et HcCm-30 near Little Reid Brook;
- HcCm-6, HcCm-7, HcCm-8, HcCm-9, et HcCm-10 along Edwards Cove.

Inventories carried out in 2011-13 along the road corridor and around Edwards Cove in 2012 did not identify any new archaeological sites (AECOM, 2014). However, a reassessment of the sites extended the extent of two known sites, HcCm-08 and HcCm-20.

Studies to be carried out:

As with the mine site, additional work will be required to ensure that the new configuration of the proposed road (Option A) and associated borrow pits will not impact potential archaeological resources. An archaeological reassessment will therefore have to be carried out, possibly leading to an archaeological inventory in the field in 2024 and, if necessary, in 2025.

Since option C of the access road and the possibility of new port infrastructure in Voisey's Bay were not part of the Quest Rare Minerals' project in 2011-13, no field surveys had been carried out in the areas now affected by these variants. However, a recent review of the archaeological situation and potential was carried out by AECOM (2024). This review of the various available documentary sources was aimed at identifying potential known archaeological sites, as well as areas of high archaeological potential within a 2.5 km wide corridor on either side of Option C of the access road. The area considered also included the area identified (and its surroundings) for the construction of new port facilities in Voisey's Bay. No known archaeological sites were found in the corridor of Option C of the access road, nor in the area identified for the establishment of new port facilities in Voisey's Bay. The closest known archaeological sites are located just under 5 km to the east, on Little Point, where numerous tent rings are present (including site HbCl-2), and then just under 4 km to the northwest, where another concentration of tent rings and old campsites are located (including site HbCm-30).

In terms of archaeological potential, the entire riparian zone of the Konrad and Toma brooks bordering Option C of the road is considered to have a high potential. This is also the case for the area identified for the new port facilities, since it lies not far from the mouth of Toma Brook and can be docked from Voisey's Bay. Areas of medium to high archaeological potential are also found in various locations within or near the corridor identified for Option C of the access road, notably around Toma Brook and the lakes that feed it, near Core Hill, in the upper portion of the Konrad Brook valley, in the vicinity of Kokoluk Pond (particularly on the eskers present), as well as around Makhavinekh Lake and its watershed. An archaeological field assessment should be carried out in 2024 and, if necessary, in 2025 in the area affected by Option C of the access road and the Voisey's Bay port facilities. This will determine whether any archaeological resources are likely to be affected by this project variant.

15.4.3 Separation Plant Site (Sept-Îles)

Since the establishment of a separation plant in Sept-Îles was not part of Quest Rare Minerals Project, no archaeological study has yet been carried out on the site planned for the implementation of this plant. According to *the Inventaire des sites archéologiques du Québec* (Gouvernement du Québec, MCC, 2023), there are no known archaeological sites on the site identified for the processing and separation plant. The closest known archaeological sites are located further south, in downtown Sept-Îles, near Baie des Sept-Îles, some 7.5 km away.

Studies to be carried out:

An archaeological assessment will be carried out in 2024 concerning the identified site for the implementation of the plant, which may lead to an on-site archaeological inventory in 2024 and, if necessary, in 2025.

15.5 Landscape

Landscape studies were conducted in 2012-2013 regarding the Quest Rare Minerals Project. The study conducted for the proposed mining site indicated that it is characterized by open, sparse, stunted vegetation covering a series of hills and depressions, providing observers with a wide field of vision over a hilly topography with little human development (AECOM, 2013j). This is the case in most viewpoints, especially when navigating the eastern part of Lake Brisson. The study also indicated that this landscape was infrequently used and therefore considered to have moderate intrinsic value for both Indigenous and non-Indigenous users.

The study in the area of the proposed road (Options A and C) and the surroundings of Edwards Cove indicated that the landscape within the corridor identified at the time exhibited variable sensitivity to the development of new infrastructure (AECOM, 2013k). Thus, the westernmost portion of the corridor had low resistance, mainly due to its low capacity for absorption and its monotonous landscape, despite the open panoramic views. The central portion of the corridor could present moderate sensitivity if the road was built on the plateau (due to the moderate visual value of the landscape) or high sensitivity if it was constructed in the valley of the Ikadlivik River (due to the high visual value of the landscape and its interest among the Indigenous communities in this area). Finally, the easternmost portion of the corridor (roughly near Little Reid Brook and near Edwards Cove) exhibited moderate sensitivity due to its high visual accessibility and the moderate visual value of the landscape.

Studies to be carried out:

Since the configuration of the various project components is different from those planned for the Quest Rare Minerals Project, and since the use of the areas concerned and their surroundings may have changed since the last study, a new landscape study is planned as part of the present project. This landscape study will also include the site of the proposed rare earth separation plant in Sept-Îles. The landscape study will be conducted once the design studies are sufficiently advanced to identify the viewpoints potentially affected.

15.6 Areas of Interest

There are no known protected areas within or immediately near the areas affected by the various project components. The Kuururjuaq National Park, Ulittaniujalik National Park, and the Pyramides Mountains National Park Reserve, are all located more than 200 kilometers north of the proposed mining site. In Addition, the Rivière-George territorial reserve for protected area purposes is located about 30 kilometers west of the proposed mining site. With an average width of 40 kilometers, this territory stretches for approximately 350 kilometers along the George River.

Several protected areas are located close to the site of the proposed processing and separation plant in Sept-Îles. The closest are in Sept-Îles Bay, less than 3 km south of the planned site. These are the Baie des Sept-Îles 4 and 5 waterfowl areas, and the Marais-de-la-Baie-de-Sept-Îles protected area reserve. Three biological refuges (09451R042, 09451R044 and 09451R048) are located north of the proposed plant site, at 5.05, 6.25 and 8.15 km respectively. In addition, the proposed Moisie River Aquatic Reserve and the Rivière-Moisie Protected Area Reserve are located approximately 11 km east of the proposed plant site.

PART E – FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS AND MUNICIPAL INVOLVEMENT AND EFFECTS

16 Project Funding

Torngat Metals has received a private investment in 2022 to complete the pre-feasibility study (PFS), the bankable feasibility study (FS) and the impact assessment. The Strange Lake Project under Torngat Metals is not depending on government agency funding; federal nor provincial funding.

17 Federal Lands

No federal land is located within the territories concerned by the Strange Lake Project.

18 Implication of Jurisdictions in the Project's Assessment

Given its scope and the location of its various components in the province of Quebec both north and south of the 55th parallel, as well as in the province of Newfoundland and Labrador on the Labrador Inuit Settlement Area (LISA) and Labrador Inuit Lands (LIL) (Map 3-1), the Strange Lake rare earth mining project is subject to various environmental assessment processes governed by the laws of the federal government, the Nunatsiavut government, the Government of Newfoundland and Labrador and the Government of Quebec. All jurisdictions have divisions and/or departments that lead the analysis and authorization/licensing process. The main jurisdictions are described in more detail in the following subsections.

A single registration document, the "Initial Project Description (IPD) for the Strange Lake Rare Earths Mining Project", dated September 2023, has been submitted to the responsible authorities of the Federal Government, the Nunatsiavut Government and the Government of Newfoundland and Labrador to initiate the environmental assessment processes in these three jurisdictions. Article 19 (f)[28] and Part 10 of the *Regulations regarding the review of initiatives on Labrador Inuit Lands* of the Environmental Review Regulations (CSL E-4, 31-03-2017, original enactment NGSL 2012-07) concerns specifically the Reviews[29].

Separate registration documents, the "Preliminary Information on Strange Lake Rare Earth Mining Project" dated May 2023 and the "Avis de projet d'une usine de séparation et purification des terres rares à Sept-Îles" dated November 2023, have been submitted to the Quebec government to initiate the environmental assessment processes applicable north and south of the 55th parallel respectively.

The Proponent understands that permits will be required from all jurisdictions independently from the environmental assessment process.

18.1 Government of Canada (Federal)

In addition to the Impact Assessment Act, Torngat Metals will ensure compliance with various regulations. Therefore they will apply for permits and authorizations necessary for the construction and operation of the project. Table 18-1 is a preliminary list of federal permits or approvals that might have to be obtained.

[28] Information notice of initiatives and requests for Environment Division's advice 19. A proponent may give the Environment Division written notice of an initiative and request the Division's informal advice on whether or not the initiative: ((f): may be the subject of a project-specific harmonization agreement

[29] https://www.nunatsiavut.com/wp-content/uploads/2018/12/E-004-Environmental-Review-Regulations31-03-2017.pdf

Table 18-1: Preliminary List of Federal Permits and Authorizations

Federal Authorizations/permits	Regulation and responsible authority
License for the manufacture and storage of explosives	Explosives Act (Natural Resources Canada)
Permit for the transport of explosives	Explosives Act (Natural Resources Canada)
Permit to carry out an activity involving a species at risk	Species at Risk Act (DFO and ECCC)
Permit for Migratory Birds Regulations	Canadian Wildlife Service (CWS) and ECCC
Authorization to carry on the work, undertaking or activity that results in the harmful alteration, disruption, or destruction of fish habitat, in accordance with the conditions set out in the authorization (if required)	Fisheries Act (R.S.C., 1985, c. F-14), art 35
Amendment of Schedule 2 of the MDMER, to permit deposit of mine residues into a new tailing impoundment area (if required)	Metal and Diamond Mining Effluent Regulations (MDMER)
Construction of the airstrip/ aerodrome/heliport	Canadian Aviation Regulations and Standards (Transport Canada)
Approval for a work that may interfere with navigation (if required)	Canadian Navigable Waters Act
The licensed marine shipping company appointed by Torngat Metals will navigate according to the laws, standards, regulations, and restrictions in place.	Oceans Act; Navigation Protection Act Migratory Birds Convention Act; Marine Mammal Regulations Canada Shipping Act;

18.2 Nunatsiavut Government

This Registration document addresses the requirements of the Nunatsiavut Government (NG) under the *Nunatsiavut Environmental Protection Act* (CIL 31-12-2012 N-5)[30], the Labrador Inuit Land Claims Act and Labrador Inuit Land Claims Agreement, and their Regulations Regarding the Review of Initiatives on LIL, as well as according to the Environmental Assessment process in Labrador Inuit Settlement Area[31] (LISA) and outside Labrador Inuit Lands (LIL). The LIL comprises 23 chapters, some of which are applicable to the project.

It is important to understand that a single document has been produced to satisfy the requirements of all three levels of government (NG, Federal and NL) due to the collaborative context of this project under detailed impact assessment (Detailed Review Process) and the processes under Section 4.14 of the Nunatsiavut Environmental Protection Act (ref. Harmonization of Environmental Assessments)[32]:

This Document is in accordance with Section 5 elements of the *Regulations Regarding Environmental Reviews of Initiatives on LIL* pertaining to the Project Notice filing (Sections 25 à 40).

As stated in the Labrador Inuit Land Claims Agreement on the subject of Environmental Assessment process on Labrador Inuit Lands, an Environmental Assessment must contain a description of the existing environment (11.2.10 (d)).

In addition to the application of the *Nunatsiavut Environmental Protection Act* permits and authorizations will have to be obtained. Table 18-2 provides a preliminary list of applicable permits and authorizations. The Nunatsiavut Government's register of laws and regulations is available on their website (Nunatsiavut Government, 2023).

[30] https://www.nunatsiavut.com/wp-content/uploads/2021/06/CIL-31-12-2012-N-5-Nunatsiavut-Environmental-Protection-Act.pdf
[31] https://www.gov.nl.ca/exec/iar/files/lilca_impplan_ch11.pdf
[32] NG: Nunatsiavut Environmental Protection Act : https://www.nunatsiavut.com/wp-content/uploads/2021/06/CIL-31-12-2012-N-5-Nunatsiavut-Environmental-Protection-Act.pdf

Table 18-2: Preliminary List of Permits and Approvals for the Nunatsiavut Government

Provincial Authorizations/permits	Regulation and responsible authority
Nunatsiavut Environmental Protection Act IL 2010-07	Environmental Assessment Registration and Certificate of Approval
Building Accessibility Act	Building and Accessibility Exemption Registration
Nain Inuit Community Government	Development Permits
Nain Inuit Community Government Municipal Plan 2016-2026, 2016	Municipal Plan amendment
Nain Inuit Community Government Development Regulations	Building Permits

18.3 Québec Government

In Quebec, project components located north of the 55th parallel (mine, concentration plant, aerodrome and portion of road located in Quebec) are subject to a separate process from that applicable south of the 55th parallel (Sept-Îles Separation Plant).

18.3.1 Mining Project (north of the 55th parallel)

In terms of the environmental assessment procedure, in accordance with the terms set out in the James Bay and Northern Québec Agreement (JBNQA), Chapter II of the Environment Quality Act - *Loi sur l'environnement du Québec* (LQE) (L.R.Q, c. Q-2) provides specific provisions applicable to the northern regions of Québec. The applicable environmental assessment procedures are different in that representatives of the Indigenous communities living there are directly involved in the decision-making process.

The Strange Lake Rare Earth Mining Project (Strange Lake Project) is located north of the 55th parallel, a region for which the JBNQA created the Kativik Environmental Advisory Committee (KEAC). The KEAC oversees the application and administration of the environmental protection regimes provided for in the JBNQA. On the other hand, the preliminary assessment and review of projects are carried out by the Kativik Environmental Quality Commission (KEQC).

Appendices A and B of the *Environment Quality Act* and the JBNQA specify which development projects are compulsorily subject as well as those which are compulsorily excluded from the environmental impact assessment and review procedure of the Environmental and Social Impacts Study (ESIS) and review. Any mining project, including the expansion, transformation or modification of an existing mining operation and any access road to a locality or road infrastructure for a new project are automatically subject to this ESIS and the procedure assessment and review of the *Environment Quality Act* and the *Réglement relatif à l'évaluation et l'examen des impacts sur l'environnement de certains projets* - Regulation respecting the assessment and review of the environmental impacts of certain projects.

In the case of the Strange Lake Project, the procedure is led by the representative of the *ministère de l'Environnement et de la Lutte contre les Changements climatiques, de la Faune et des Parcs du Québec* (MELCCFP), i.e., the Industrial, Mining, Energy and Northern Projects Environmental Assessment Branch. For its part, the KEQC carries out the analysis and the evaluation.

In addition to the application of the *Environment Quality Act* permits and authorizations will have to be obtained. Table 18-3 provides a preliminary list of applicable permits and authorizations.

18.3.2 Separation Plant (Sept-Îles)

Chapter I of the Environment Quality Act defines the environmental impact assessment and review procedure that applies in the southern part of Quebec (south of the 55th parallel). Under the “Regulation respecting the environmental impact assessment and review of certain projects”, the construction of a rare earth separation plant is subject to this environmental impact assessment and review procedure, regardless of the plant's capacity.

In addition to the application of the Environmental Quality Act, permits and authorizations will have to be obtained such as for the North of the 55th parallel (see Table 18-3).

Table 18-3: Preliminary List of Permits and Approvals for the Quebec Government (North and South of the 55th parallel)

Provincial Authorizations/permits	Regulation and responsible authority
Ministerial authorization for the construction and operation of the mine	Environmental Quality Act (MELCCFP)
Specific authorization for the construction and operation of an industrial establishment or the use of an industrial process that could modify the quality of the environment	Environmental Quality Act (MELCCFP)
Authorization for any activity involving the withdrawal of groundwater or surface water (dewatering, keeping dry, water supply, etc.)	Environmental Quality Act (MELCCFP)
Authorization for water management or treatment facilities	Environmental Quality Act (MELCCFP)
	Regulation respecting the quality of drinking water
Specific authorization for any work, construction or other intervention in wetlands and hydric environments covered by the Act	Environmental Quality Act (MELCCFP)
Intervention permits for activities required for public utility work	Sustainable Forest Development Act - (MRNF)
Compensation plan	Act respecting compensation measures for projects affecting a wetland or water body
Authorization for devices or equipment intended to prevent, reduce or stop the release of contaminants into the atmosphere	Environmental Quality Act (MELCCFP)
Authorization for the establishment and operation of a waste disposal facility [N]	Environmental Quality Act (MELCCFP)
Industrial sanitation certificate	Environmental Quality Act (MELCCFP)
Authorization to carry out an activity likely to modify wildlife habitat	Faune Québec (MELCCFP) via Act Respecting Threatened or Vulnerable Species
Authorization to construct or upgrade a multi-use path [N]	Sustainable Forest Management Act [N]
Permits for use of high-risk petroleum storage equipment	Safety Code and Building Code. These codes are governed by the Building Act. Permit are delivered by Régie du Bâtiment du Québec.
Approval of the mine residue management sites (waste rock and mine residue stockpile areas) and of the concentration plant	Mining Act
Redevelopment and Restoration Plan Approval	Mining Act
Authorization to use public land	Crown Lands Act
Explosives permit [N]	Explosives Act [N]
Sûreté du Québec permit [N]	Explosives Act [N]

[N]: Excluding North of the 55th parallel

18.4 Government of Newfoundland and Labrador

This Registration Document also complies with the provincial government of Newfoundland and Labrador (NL) under the *Environmental Protection Act* (SNL, 2002 cE-14.2) and the Environmental Assessment Regulations, 2003[33].

As dictated by the Environment Protection Act (EPA) of the province (2002 cE-14.2 s57), an Environmental impact statement (EIS) or Environmental preview report (EPR) may be needed for the road corridor. A description of the local environment that will be affected by the project would then be needed.

According to the Newfoundland and Labrador Regulations[34] anyone who plans a project having a significant impact on the nature, social and economic environment is required to establish the Environmental Assessment (EA).

In addition to the application of the *Environmental Protection Act* permits and authorizations will have to be obtained. Table 18-4 provides a preliminary list of applicable permits and authorizations.

Table 18-4: Preliminary List of Permits and Approvals for the Government of Newfoundland and Labrador

Provincial Authorizations/permits	Regulation and responsible authority
Access/ haul road construction	Urban and Rural Planning Act (Urban Planning and Protected Road Regulations - Municipal and Provincial Affairs)
	Protected Road Zoning Regulations (Urban Planning and Protected Road Regulations - Municipal and Provincial Affairs)
Wood cutting	Forestry Act – cutting of timber (Forestry Act - Fisheries, Forestry and Agriculture)
Permit & registration of new Petroleum Product storage tank	Environmental Protection Act. Storage and Handling of Gasoline and Associated Products Regulations, 2003. Fire Prevention Act (Storage Tank is NL Environment and Climate Change)
Development in wetlands	Water resources Act (Development in Wetlands is NL ECC – WRMD)

[33] NL : Environmental Assessment. Guide to the Process https://www.gov.nl.ca/ecc/files/GUIDE-TO-THE-PROCESS_Jan-2023.pdf
[34] GUIDE-TO-THE-PROCESS_May-2022.pdf (gov.nl.ca)

PART F – MAIN ISSUES AND POTENTIAL EFFECTS OF THE PROJECT

19 Potential Changes to the Environment

19.1 Description of the Main Issues

The main environmental and social issues specific to the northern and Sept-Îles components of the Strange Lake rare earth mining project that can be identified at this preliminary stage of project development are summarized in Table 19-1 and detailed in the following paragraphs.

The completion of pre-feasibility and feasibility studies will make it possible to validate or clarify these various issues, and eventually to identify new ones.

During the environmental impact assessment, the potential effects will not only be addressed for the study area where modifications are planned but will also be made at a larger scale, at the level of an enlarged study area, for addressing appropriately the potential effects of the different ecosystems and communities that might be affected by the project and others through time (see Section 25 Cumulative effects).

Table 19-1: Key environmental issues of the Strange Lake Mining Project

Development, construction	Operation	Closure, restoration	Issues	Physical environment	Biological environment	Social environment
X	X	X	Protection of human health and quality of life in communities	X	X	X
X	X	X	Protection of biodiversity, both flora and fauna, especially species at risk		X	X
X	X	X	Preservation of the quality and ecological functions of receiving environments, notably wetlands, bodies of water and soils, including permafrost in the north	X	X	
X	X	X	Maintenance, access and conciliation of land use			X
X	X	X	Climate change and the balance of GHG emissions	X		
X	X	X	Social acceptability			X

19.1.1 Issue - Protection of Human Health and Quality of Life in Communities

The human health and quality of life of communities residing or active in the study areas of the various project components could be affected by the implementation of the different phases of the project, in particular with regard to:

- risks associated with the potential release of contaminants (metals, radioactive elements) into air, water or soil, and their movement through the ecosystem and food chain ;
- socio-economic impacts of the project ;
- psychosocial effects of the project.

More specifically, a rare earth mining project raises issues of toxicity and radioactivity of the contaminants generated by the different phases of the project. These concerns have been expressed in consultations conducted in the communities closest to the project in Québec and Labrador. In the north, specific concerns relate to the consequences of mining activities on the quality of water, air, soil, or plants and eventually on the traditional diet of these populations (berries, caribou, fish). In Sept-Îles, concerns could be raised about industrial wastewater discharges and atmospheric emissions from the plant, as well as their effect on the environment and inhabited areas. Moreover, the presence of radionuclides in process residues stored on land adjacent to the plant could also raise concerns, even if these elements are naturally occurring radioisotopes. Therefore, a Human Health and Environmental Risk Assessment (HHERA) will be an integral part of the impact study that will be conducted for this project. This HHERA will identify not only the contaminants of concern but also the ecological and human receptors potentially exposed to the project activities and to identify the exposure pathways of the receptors retained for the risk assessment. The references used for this HHERA are those of the *Centre d'Expertise en Analyse Environnementale du Québec* (CEAEQ) on radiotoxic risks (2015) and other applicable guidelines from Health Canada according to *Guidance for Evaluating Human Health Impacts in Environmental Assessment: country foods (2018),* the *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Radiological Impacts* (2016) and current *Interim Guidance Document for the Health Impact Assessment of Designated Projects under the Impact Assessment Act,* Impact Assessment Agency of Canada (2022) through *Analyzing Health, Social and Economical Effects* under *the Impact Assessment Act* (2020*),* and Environment Canada.

19.1.2 Issue - Protection of Biodiversity, Both Flora and Fauna, Including Species at Risk and Species of Importance to Indigenous Communities

In the north, the project's integration environment is both rich and fragile in terms of biodiversity. It includes sensitive habitats for species valued by Indigenous communities occupying or using the land, such as the caribou and the Arctic char. Species at risk are also likely to be found in the northern study area. In Sept-Îles, the projected plant site is overlapping some drainage of the Au Foin River, where the presence of American eel and a spawning ground of rainbow smelt are reported. The presence of wetlands is also suspected on this site.

The protection of biodiversity therefore concerns:

- protection of sensitive habitats of fish communities (such as salmonids in the North and rainbow smelt in Sept-Îles), benthic organisms, aquatic plants, and species at risk ;
- maintaining migratory corridors for caribou, Arctic char, American eel, and migratory birds ;
- protection and preservation of the territory's wildlife and flora resources valued by inhabitants, in particular by the Indigenous groups concerned (notably caribou, Arctic char, etc.).

19.1.3 Issue - Preservation of the Quality and Ecological Functions of Receiving Environments, Notably Wetlands, Bodies of Water and Soils, Including Permafrost

Due to the location of the project's northern components in a territory characterized by numerous watercourses and the presence of permafrost, the project's integration environment has specific characteristics that must be taken into account and preserved as far as possible. In Sept-Îles, the projected plant site is overlapping patches of wetlands, and the drainage of the Au Foin River, which is a tributary of the Baie des Sept-Îles. It is also possible, during extreme weather events, that the final treated effluent of the separation plant may be discharged to the Au Foin River, which provides freshwaters with varying feeding resources and minerals.

Therefore, particular attention must be paid to the following characteristics of receiving environments:

- hydrodynamic conditions (water and sedimentary regime, drainage) ;
- wetlands, aquatic and riparian environments ;
- soils, including permafrost in the north that may be affected by the excavation of a pit at the mine site and along the road corridor.

19.1.4 Issue - Maintenance and Conciliation of Land Uses in the North

The possible disruption of land and resources use during the various phases of the project is a major issue for the project's northern components. Indeed, the northern areas where the mine, the road and the port storage area will be inserted is used by various Indigenous communities and potentially by Indigenous and non-Indigenous businesses. Maintaining access to the territory and reconciling current and planned uses is therefore an important issue for the project.

19.1.5 Issue - Climate Change and the Balance of GHG Emissions

The purpose of the project is to exploit resources that are essential to the transition of the economy to renewable energy. Indeed, the main rare earth elements targeted by the exploitation will improve energy performance both during the production of electricity (e.g., wind energy) and during the use of electrical energy (e.g., motors). In this sense, the project aims to contribute to the fight against climate change. Nevertheless, the balance of GHG emissions of each phase of the project, the strategies for reducing these emissions and their possible offsetting are important issues.

As a large part of the project is carried out in a northern territory particularly sensitive to climate change, the risks arising from these climate changes on the implementation of the various phases of the project also constitute a significant issue.

19.1.6 Issue - Social Acceptability

In accordance with the principles of sustainable development, social acceptability is an essential condition for the realization of any project likely to impact the biophysical and human environments. In the case of the Strange Lake rare earth mining project, acceptance of the project by the Indigenous and non-Indigenous communities directly affected will be particularly important, both in northern and Sept-Îles areas.

19.1.7 Taking into Account Environmental and Social Issues in Project Design

The nature and intensity of anticipated positive and negative impacts of the project on the receiving environment are largely associated with the characteristics of the project components, and therefore on their design. The following is a summary of the project phases and key activities of the Strange Lake Project which can be source of impacts (see details in Section 9):

- **Northern project components:**
  - **Development phase (preliminary work) and construction:** installation of temporary facilities (camp, road), site preparation, fuel storage area, use and movement of machinery, road construction and infrastructure and establishment of the mine residue stockpile and other mining materials stockpiles (stripping, excavation, grading, backfilling), water supply network, drainage of runoff water, mine water, domestic wastewater, etc. ;
  - **Operational phase (30-year operation):** transportation and processing of concentrate, presence, and use of related infrastructure (plant, etc.), presence of workers (living environment and travel), waste management;
  - **Closure and restoration phase**: Closure of the mine site, appropriate remediation activities (progressive dismantling of project infrastructure; heavy equipment traffic, mobile and stationary equipment, materials; presence of workers (living environment and travel).
- **Sept-Îles project components:**
  - **Development phase (preliminary work) and construction:** site preparation, use and movement of machinery, rail siding / access road construction and infrastructure, establishment of the process residue stockpile (stripping, excavation, grading, backfilling), construction of plant and associated facilities, including industrial wastewater treatment plant and its discharge point, etc. ;

- **Operational phase (30-year operation):** transportation of concentrate from the port terminal to the plant, operation of the plant, wastewater and air emission treatment, residue management ; presence of workers;
- **Closure and restoration phase**: Closure of the plant and of the residue stockpile, appropriate remediation activities.

The potential environmental and social issues associated with these activities will be taken into account from the earliest stages of project design (pre-feasibility, feasibly) right through to detailed design, in order to eliminate or reduce potential impacts at source as much as possible, as well as to enhance the positive impacts.

19.2 Description of the Main Anticipated Impacts of the Project on the Receiving Environment, Planned Mitigation or Restoration Measures

The main apprehended impacts of the project on the receiving environment were considered by assessing the potential Valued Ecosystem Components (VECs) and analyzing their potential interactions with the project. The following list presents the most relevant criteria for the selection of potential VECs:

- the recognition of the importance of a component through legislation, regulation or policy ;
- the sensitivity or vulnerability of the component ;
- the uniqueness or rarity of the component ;
- the sustainability (durability) of the component or ecosystem ;
- the value or importance assigned to the resource by stakeholders ;
- the risks to health, safety or well-being of the public ;
- the ecosystem characteristics, both of the northern environment (beyond the forest line and in the presence of discontinuous permafrost) and of the Sept-Îles environment.

Table 19-2 presents the key environmental components and indicators to be considered as a basis for identifying VECs. The VECs are selected while taking into consideration the above-mentioned criteria, which include the potential interactions with the project, presence within the spatial boundaries, Indigenous interests or rights, and priorities of the federal, provincial, territorial or municipal governments. During the impact assessment, the potential effect analysis will also be addressed as a whole and will include the assessment of interactions between VECs and this, in the regional study area. The existing baseline conditions will be discussed for each of the VECs using existing literature, reports, government data, and field data collected for the project. Mitigation measures will include best management practices as well as project-specific measures that may be required as a result of the discipline-specific evaluations.

Table 19-2: Draft list of critical environmental components, key indicators and project rationale for selection

Critical environmental components	Examples of key indicators	Rationale for choice
Physical environment		
Greenhouse gases, air quality	• Greenhouse gases – Metric Tons of CO2 eq. • Concentration of ambient air contaminants (dust – Particulate matter, metals, Volatile Organic Compounds (VOCs), radioactive elements, CO2, CO, NOx, SOx)	• Importance of complying with various provincial regulations and standards specific to the property limits • Essential to life and the maintenance of human health and well-being and the biological environment • Potential for transboundary effects, affecting Labrador
Acoustic environment (ambient noise and vibrations)	• Ambient noise level (dB), vibrations	• Importance of complying with different provincial regulations and standards specific to the property limits at the sensitive receptor location • Essential to life, the maintenance of human health and well-being, and the biological environment
Soil health	• Soil health • Terrain stability and soil erosion • Effect on permafrost freeze-thaw cycle (northern components of the project)	• Importance for maintaining soil stability • Serves as a pathway for interactions between the project and other components of the environment
Water and sediment regime, water and sediment quality	• Surface and groundwater quantity and quality	• Importance to human life and ecosystem functions, particularly in the George River watershed for the northern components of the project, and in the Baie des Sept-Îles • Serves as a pathway for interactions between the project and other components of the environment
Biological environment		
Vegetation and wetlands	• Abundance and diversity of terrestrial plant communities • Abundance and diversity of wetlands	• Fundamental role in maintaining terrestrial, riparian and wetland ecosystems (biodiversity, hydrological function, wildlife habitats, traditional use of resources, etc.) • Susceptibility of certain types of vegetation in the northern environment to disturbance
Aquatic fauna (benthos, fish) and habitats	• Species presence and population abundance • Habitat quality and abundance	• Subsistence significance for Indigenous communities, biological, cultural, other use (recreational) • Legal protection of habitats under provincial and federal legislation • Maintaining biodiversity • Fragility (lower resilience, reduced growth rate, lower productivity) of aquatic habitats in northern environments
Avifauna (migratory and non-migratory birds)	• Abundance and diversity of migratory and non-migratory birds • Habitat quality and abundance	• Social, cultural and economic importance (migratory bird watching and hunting) to local populations and Indigenous people • Maintaining biodiversity
Caribou	• Migratory George River herd	• Biological, cultural and subsistence significance for Indigenous peoples • Herd in a precarious situation following a drastic decline in the population

Table 19-2: Draft list of critical environmental components, key indicators and project rationale for selection (Cont'd)

Critical environmental components	Examples of key indicators	Rationale for choice
Biological environment		
Flora and fauna species at risk or in precarious situation	• Plants at risk, threatened or vulnerable • Wildlife species at risk, threatened or vulnerable	• Protection of species, their habitat and biodiversity • Legal protection of species and their habitat under the federal Species at Risk Act, Québec's Act respecting threatened or vulnerable species and Newfoundland and Labrador Endangered Species Act (e.g., harlequin duck, peregrine falcon)
Social environment		
Current and traditional use of land and resources - for Indigenous peoples and the general population	• Current and traditional use of land and resources for recreational or commercial purposes • Traditional and current use of land for subsistence, cultural or recreational purposes by Indigenous and non-Indigenous people • Protected areas	• Important and valued component on the socio-economic and cultural level • Reflects the characteristics, traditions and values shared by users from many communities, including Indigenous communities • Potential interactions with outfitters, adventure tourism businesses or protected area managers serving this region
Cultural heritage	• Historical, archaeological and heritage sites and resources	• Identification of a few sites, especially on the periphery of the proposed development • Management of these resources deemed important and at risk
Human quality of life and health	• Quality of life, well-being and health of people and communities	• Potential interactions between the project and the population and communities, both Indigenous and non-Indigenous • Health risks arising from the potential emission of contaminants and their movement through the ecosystem, as well as psychosocial effects
Employment and economy	• Jobs • Workforce training • Local and regional economy • Business development in services, supplies and equipment	• Socio-economic impacts of the project for local and regional communities (positive and negative)
Landscape	• Views of the mining complex, especially from Lake Brisson • View of the separation plant and of the residue stockpile, particularly from populated areas or viewpoints valued by residents and visitors	• The tundra is recognized as a landscape devoid of trees and human infrastructure, so significant visibility of the project is anticipated • Sept-Îles is recognized as a prime destination for outdoor activities.

Some of the potential environmental effects are outlined in more detail in the following subsections, based on the project phases and for the most likely valued environmental components (VECs). VECs are discussed based on potential interactions with project impact sources for the different phases of the project while combining them with specific mitigation measures to mitigate anticipated impacts. This process will be undertaken using a vision of the application of the precautionary principle in order to account for all direct and indirect potential effects as well as their induced harm to the ecosystem.

Specifically, Table 19-3 addresses the sources of potential effects and potential change upon project phases for the fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act,* and the aquatic species definition under the subsection 2(1) of the *Species at Risk Act* and the migratory birds as defined in subsection 2(1) of the *Migratory Birds Convention Act.* The effect assessment on fish and fish habitat (FAFH) and migratory birds will identify the project activities and infrastructure that may adversely affect the FAFH and migratory birds environmental valued

components (VECs) and will identify mitigation measures to minimize or eliminate potential effects. The effect assessment will provide an evaluation of residual effects, considering the implementation of mitigation measures, and their importance will be determined. Information on the methodology to identify, evaluate, and rate the adverse effects and determine their significance will be provided in the ESIA. Thus, the ESIA will include the baseline data for the FAFH and migratory birds and will include an analysis of effects from the project interactions, an assessment of residual and cumulative effects, and determining the significance of effects to all EVCs, such as water and sediment quality. More details about methods and data collection are provided in Sections 14.2.2 and 14.2.4 under *Studies to be carried out in 2024*. The significance of the Arctic char for the communities will be addressed in the effects assessment (land use mapping, critical habitats, fishing areas)

Table19-3: Fish and fish habitat (FAFH) and migratory birds potential change, mitigation measures under the project phases based on the main sources of potential effects.

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Development and construction phase			
Fish and Fish Habitat (fish, benthic invertebrates, aquatic plants) & Surface Water/ Sediment Quality	• Construction of the access road • Mine site preparation works • Separation plant site preparation works • Use and circulation of heavy machinery and fixed and mobile equipment (mine, road, port storage facilities, separation plant) • Presence of temporary infrastructures and facilities • Construction of permanent infrastructures and facilities • Water crossings along the road access • Potential temporary watercourse diversion and change to natural drainage • Presence of workers (including camp and waste, emissions and discharges) • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants • Permanent or temporary loss of aquatic habitats • Modification of water and sediment quality (inputs to the aquatic environment) • Degradation of fish habitat • Possible modification of aquatic communities • Impediment to the free movement of fish • Detour of waterways at the mine site, and water crossings along the access road • Erosion, risk of spills altering the aquatic environment or groundwater • Introduction of aquatic invasive species	• Localisation and preservation of all species sensitive habitats, including spawning grounds and rearing habitats for salmonids (Arctic char, Atlantic salmon, brook trout, lake trout) • Providing safe passage for fish for altered water bodies • Examining all alternatives in the planning phase to avoid/minimise the harmful alteration, disruption or destruction of fish habitat • Preliminary and regular inspection of the machinery to ensure its good condition and operation. Carry out preventive inspections of fuel storage areas and supply emergency kit for the recovery of petroleum products and hazardous materials available in vehicles, machinery and worksite facilities. • Locate parking, washing and maintenance areas for machinery at least 60 m from any watercourse. Refuelling of machinery shall be carried out under constant supervision and at a minimum distance of 30 m from a watercourse. • Install a geomembrane downstream of crossings and around work areas to intercept SM particles, use culverts of sufficient size so as not to significantly narrow the flow sections at crossing points, prevent the transport of fine particles during work by installing sediment barriers around the edges of aquatic environments. • Prohibit fording in waterways (intermittent and permanent) • Submit a Compensation Plan for fish and fish habitats if residual impacts cannot be mitigated at the planning phases above, adapted to the specific environment • The ESIA will include specific measures to prevent, control, manage, and monitor appropriately aquatic undesirable species.

Table 19-3: Fish and fish habitat (FAFH) and migratory birds potential change, mitigation measures under the project phases based on the main sources of potential effects (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Development and construction phase			
Migratory Birds	• Construction of the access road • Mine site preparation works • Separation plant site preparation works • Use and circulation of heavy machinery and fixed and mobile equipment (mine, road, port storage facilities, separation plant) • Presence of temporary infrastructures and facilities • Construction of permanent infrastructures and facilities • Presence of workers (including camp and waste, emissions and discharges) • Addition of light source • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants) • Permanent or temporary loss of nesting and rearing habitats • Noise disturbance to breeding pairs, broods and migratory birds • Light sources may alter the orientation of birds during migration	• Fencing to limit circulation outside of working areas in bird nesting habitats • Avoid any tree and brush cutting and circulation on undisturbed soil during nesting period • Preliminary and regular inspection of the machinery to ensure its good condition and operation • Avoid leaving vehicles running unnecessarily • Light sources facing downwards • Use of green light sources

Table 19-3: Fish and fish habitat (FAFH) and migratory birds potential change, mitigation measures under the project phases based on the main sources of potential effects (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Operational Phase			
Fish and Fish Habitat (fish, benthic invertebrates, aquatic plants) & Surface Water/ Sediment Quality	• Excavation of the pit • Transportation of the mineral resource along the road access, shipment of goods, raw materials • Treatment and concentration of the mineral resource that will include water management and treatment, discharges (effluent) • Rare earth separation potentially requiring wastewater treatment and discharge • Mine residues and waste rock management • Separation plant residue management • Mining and transportation activities • Use and circulation of heavy machinery and fixed and mobile equipment (mine, road, port storage facilities, separation plant) • Presence of workers (including camp and waste, emissions and discharges) • Transport by ship from and to Sept-Îles Port • Transportation from the port to the separation plant site by existing rail of the material (superbags in containers). • Separation of rare earths by acid baking and hydrometallurgical processes. • Wastewater treatment and discharge. • Air emissions treatment • Presence of workers. • Process residue management.	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants • Permanent or temporary loss of aquatic habitats • Modification of water and sediment quality (inputs to the aquatic environment) • Degradation of fish habitat • Possible modification of aquatic communities • Impediment to the free movement of fish • Detour of waterways at the mine site, and water crossings along the access road • Erosion, risk of spills altering the aquatic environment or groundwater • Same as above, adapted to the specific environment	• Preliminary and regular inspection of the machinery to ensure its good condition and operation. Carry out preventive inspections of fuel storage areas and supply emergency kit for the recovery of petroleum products and hazardous materials available in vehicles, machinery and worksite facilities • Application of all mitigation measures to protect the air, water, sediment and soil quality, such as the use of dust suppressants, water treatment, and implementation of measures related to contamination hazards at the mine site and along the road corridor (transportation) • Environmental monitoring and follow-up programs¸ • For expansion/stabilisation/maintenance work: see Construction phase mitigation measures to minimise the harmful alteration, disruption or destruction of fish habitat, and protect air, water, sediment and soil quality. • Same as above, adapted to the specific environment

Table 19-3: Fish and fish habitat (FAFH) and migratory birds potential change, mitigation measures under the project phases based on the main sources of potential effects (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Migratory Birds	• Excavation of the pit • Transportation of the concentrate along the road access, shipment of goods, raw materials • Treatment and concentration of the mineral resource that will include water management and treatment, discharges (effluent) • Rare earth separation potentially requiring wastewater treatment and discharge • Mine residue and waste rock management • Separation plant residue management • Mining and transportation activities • Use and circulation of heavy machinery and fixed and mobile equipment (Mine, Road) • Presence of workers (including camp and waste, emissions and discharges) • Addition of light source • Transportation from the port to the separation plant site by existing rail of the material (superbags in containers). • Separation of rare earths by acid baking and hydrometallurgical processes. • Wastewater treatment and discharge. • Air emissions treatment • Presence of workers. • Process residue management.	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants • Permanent or temporary loss of nesting habitats • Noise disturbance to breeding pairs and migratory bird • Light sources may alter the orientation of birds during migration	• Preliminary and regular inspection of the machinery to ensure its good condition and operation to reduce noise disturbance during nesting and brood rearing • Avoid leaving vehicles running unnecessarily • If new working areas are required, proceed to nest searches and avoid disturbing nesting areas before fledging if active nests found • Light sources facing downwards • Use of green light sources

Table 19-3: Fish and fish habitat (FAFH) and migratory birds potential change, mitigation measures under the project phases based on the main sources of potential effects (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Closure and Restoration Phase			
Fish and Fish Habitat (fish, benthic invertebrates, aquatic plants) & Surface Water/ Sediment Quality	• Progressive dismantling activities of the project infrastructures • Use and circulation of heavy machinery and fixed and mobile equipment ((mine, road, port storage facilities, separation plant) • Presence of workers (including camp and waste, emissions and discharges)	• Erosion, risk of spills altering the aquatic environment or groundwater • Modification of water and sediment quality (inputs to the aquatic environment)	• Restoration Plan and monitoring, aiming at restablishing natural drainage (natural state of the receiving env., where feasible), e.g. apply mitigation measures to comply with regulations for proper Mine restoration according to *Guide de préparation du plan de réaménagement et de restauration des sites miniers du Québec* • Application of all mitigation measures to protect the air, water, sediment and soil quality, such as the use of dust suppressants, water treatment, and implementation of measures related to contamination hazards. • For closure and restoration work: see Construction phase mitigation measures to minimise the harmful alteration, disruption or destruction of fish habitat, and protect air, water, sediment and soil quality.
Migratory Birds	• Progressive dismantling activities of the project infrastructures • Use and circulation of heavy machinery and fixed and mobile equipment (Mine, Road) • Presence of workers (including camp and waste, emissions and discharges)	• Noise disturbance to breeding pairs and migratory bird	• Restoration Plan and monitoring

The next three subsections (19.2.1 to 19.2.3) provide the sources of potential effects of the project according to main activities likely to impact the receiving environment and its EVCs during the phases of the project (development and construction, operations, closure and restoration).

19.2.1 Development and Construction Phases

19.2.1.1 Activities Likely to Impact Receiving Environment

19.2.1.1.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

The main activities likely to impact the receiving environment during this phase of the project are:

- Construction of the access road (and development of watercourse crossings)
- Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.)
- Improvements to the temporary camp facilities and fuel storage area at the mine site
- Construction of airfield facilities at the mine site
- Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc.
- Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.)

- Construction and development of industrial plants and their buildings (crushing plants, concentration plants, utilities, etc.) at the mine site.
- Connexion of the seasonal access road to the port facilities
- Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area.
- Construction of the container storage and handling area, buildings, drainage, etc.
- Transport by ship for delivery of equipment to the mine site.

19.2.1.1.2 Separation Plant (Sept-Îles project component)

- Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, blasting, etc.).
- Construction and development of industrial facilities and their buildings
- Construction of process residue storage facility.
- Construction of treated wastewater pipe and outlet (if any)
- Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles).

19.2.1.2 Physical Environment

The impacts associated with this phase on the physical environment of each project component are essentially:

- Greenhouse gases (GHGs): sources of emissions associated with fossil fuels, other sources of GHGs (e.g., explosives, refrigerants, etc.).
- Air quality: sources of atmospheric emissions (dust - particulate material, metallic dust, volatile organic compounds (VOCs), radioactive elements from the deposit, gases – CO_2, NOx, SO_2. At the mine site, it should be noted that considering the proximity of the site to the provincial border, the study area will cover the areas potentially impacted on the Newfoundland and Labrador side
- Acoustic environment: noise level and vibrations: blasting, use of machinery, equipment.
- Soil quality: soil disturbance by stripping, blasting, excavation, risk of contamination due to accidental spills, soil subsidence
- Water and sediment regime: modification of surface water flow patterns, water regime, possible increase in erosion and sediment transport in watercourses, sediment transport when breaches are opened) potential sanitary and mining discharges.
- Water and sediment quality: potential detour of watercourses, erosion, risk of spills affecting the aquatic environment or groundwater, risk of increased SM.

Table 19-4 presents, on a preliminary basis, the potential impacts on the physical environment of the development and construction phases of the project, along with the mitigation measures that could be applied in response to the impacts identified during both phases. The impact assessment related to the issues raised and the development of mitigation measures in consultation, in particular, with the Indigenous communities directly concerned and with stakeholders, will make it possible to validate, specify and complete this preliminary list.

Table 19-4: Preliminary list of potential impacts on physical environment and mitigation measures (development and construction phases)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Greenhouse Gases	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine site • Construction of airfield facilities at the mine site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their at the mine site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area • Construction of the container storage and handling area, buildings, drainage, etc. • Transport by ship for delivery of equipment to the mine site • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Emissions associated with fossil fuels; • Other emissions of GHGs (e.g., explosives, refrigerants, etc.)	• Preliminary and regular inspection of the machinery to ensure its good condition and operation • Promote the use of machinery and vehicles that minimize air emissions (e.g., low fuel consumption), according to the latest Environment and Climate Change Canada (ECCC) standards, or zero-emission vehicles, for on-road and off-road vehicles • Promote the use of generators that minimize fuel consumption and therefore have low atmospheric emissions • Establish a procedure for shutting down heavy vehicles when they are not needed • Implement a preventive maintenance program, inspection of equipment to ensure its proper functioning • Inspect air conditioning, ventilation, and heating units to ensure proper operation of equipment and limit the risk of refrigerant leaks, if necessary

Table 19-4: Preliminary list of potential impacts on physical environment and mitigation measures (development and construction phases) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Air Quality	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine site • Construction of airfield facilities at the mine site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their at the mine site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area • Construction of the container storage and handling area, buildings, drainage, etc. • Transport by ship for delivery of equipment to the mine site • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Atmospheric emissions (dust - particulate material, metallic dust, volatile organic compounds (VOCs), • Radioactive elements from the deposit, gases – CO2, NOx, SO2,)	• Preliminary and regular inspection of the machinery to ensure its good condition and operation • Promote the use of machinery and vehicles that minimize air emissions (e.g., low fuel consumption), according to the latest Environment and Climate Change Canada (ECCC) standards, or zero-emission vehicles, for on-road and off-road vehicles • Promote the use of generators that minimize fuel consumption and therefore have low atmospheric emissions • Establish a procedure for shutting down heavy vehicles when they are not needed • Implement a preventive maintenance program, inspection of equipment to ensure its proper functioning • Apply dust control measures according to the conditions (meteorology) and development activities that have an impact on dust generation (e.g., construction of seasonal access roads)

Table 19-4: Preliminary list of potential impacts on physical environment and mitigation measures (development and construction phases) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Acoustic Environment	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine site • Construction of airfield facilities at the mine site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their at the mine site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area • Construction of the container storage and handling area, buildings, drainage, etc. • Transport by ship for delivery of equipment to the mine site • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Noise level and vibrations produced by blasting, use of machinery, equipment, etc.	• Preliminary and regular inspection of the machinery to ensure its good condition and operation • Establish a procedure for shutting down heavy vehicles when they are not needed • Implement a preventive maintenance program, inspection of equipment to ensure its proper functioning • Use light vehicles that have effective mufflers to reduce noise level at the source • Use sound barriers (e.g., walls, fences, soundproofing mound) around construction sites to limit the propagation of noise to sensitive receptors.

Table 19-4: Preliminary list of potential impacts on physical environment and mitigation measures (development and construction phases) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Soil Quality	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine site • Construction of airfield facilities at the mine site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their at the mine site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area • Construction of the container storage and handling area, buildings, drainage, etc. • Transport by ship for delivery of equipment to the mine site • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Soil disturbance by stripping, blasting and excavation, • Risk of contamination due to accidental spills, • Effects of work on permafrost and soil subsidence (northern areas). • Soil disturbance by stripping, blasting and excavation, • Risk of contamination due to accidental spills, •	• Preliminary and regular inspection of the machinery to ensure its good condition and operation • Implement a preventive maintenance program, inspection of equipment to ensure its proper functioning • Use light vehicles that have effective Inspect air conditioning, ventilation, and heating units to ensure proper operation of equipment and limit the risk of refrigerant leaks, if necessary • Carry out preventive inspections of fuel storage areas and supply emergency kit for the recovery of petroleum products and hazardous materials available in vehicles, machinery and worksite facilities • Construction of major infrastructure with measures to prevent thawing of permafrost

Table 19-4: Preliminary list of potential impacts on physical environment and mitigation measures (development and construction phases) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Water and Sediment Regime	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine site • Construction of airfield facilities at the mine site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their at the mine site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area • Construction of the container storage and handling area, buildings, drainage, etc. • Transport by ship for delivery of equipment to the mine site • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Modification of surface water flow patterns and water regime • Increase in erosion and sediment transport in watercourses, • Sediment transport when breaches are opened, • Potential sanitary and mining discharges.	• Preliminary and regular inspection of the machinery to ensure its good condition and operation • Implement a preventive maintenance program, inspection of equipment to ensure its proper functioning • Apply dust control measures according to the conditions (meteorology) and development activities that have an impact on dust generation (e.g., construction of seasonal access roads) • Inspect air conditioning, ventilation, and heating units to ensure proper operation of equipment and limit the risk of refrigerant leaks, if necessary • Carry out preventive inspections of fuel storage areas and supply emergency kit for the recovery of petroleum products and hazardous materials available in vehicles, machinery and worksite facilities • Locate parking, washing and maintenance areas for machinery at least 60 m from any watercourse. Refuelling of machinery shall be carried out under constant supervision and at a minimum distance of 30 m from a watercourse. • Install a geomembrane downstream of crossings and around work areas to intercept SM particles, use culverts of sufficient size so as not to significantly narrow the flow sections at crossing points, prevent the transport of fine particles during work by installing sediment barriers around the edges of aquatic environments

Table 19-4: Preliminary list of potential impacts on physical environment and mitigation measures (development and construction phases) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Water and Sediment Quality	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine site • Construction of airfield facilities at the mine site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their at the mine Site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area • Construction of the container storage and handling area, buildings, drainage, etc. • Transport by ship for delivery of equipment to the mine site • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Potential detour of watercourses, • Erosion, • Risk of spills affecting the aquatic environment or groundwater, • Risk of increased SM	• Preliminary and regular inspection of the machinery to ensure its good condition and operation • Implement a preventive maintenance program, inspection of equipment to ensure its proper functioning • Use light vehicles that have effective mufflers to reduce noise level at the source • Apply dust control measures according to the conditions (meteorology) and development activities that have an impact on dust generation (e.g., construction of seasonal access roads) • Inspect air conditioning, ventilation, and heating units to ensure proper operation of equipment and limit the risk of refrigerant leaks, if necessary • Carry out preventive inspections of fuel storage areas and supply emergency kit for the recovery of petroleum products and hazardous materials available in vehicles, machinery and worksite facilities • Locate parking, washing and maintenance areas for machinery at least 60 m from any watercourse. Refuelling of machinery shall be carried out under constant supervision and at a minimum distance of 30 m from a watercourse. • Install a geomembrane downstream of crossings and around work areas to intercept SM particles, use culverts of sufficient size so as not to significantly narrow the flow sections at crossing points, prevent the transport of fine particles during work by installing sediment barriers around the edges of aquatic environments

19.2.1.3 Biological Environment

The impacts associated with this phase on the biological environment of each project component are essentially:

- Vegetation and wetlands: loss, fragmentation and degradation of terrestrial wildlife and plant habitats, deterioration and alteration of ecological functions of terrestrial habitats, wetlands and water bodies, potential input of contaminants into terrestrial and aquatic habitats (e.g., dust deposition on vegetation and in waterbodies);
- Aquatic fauna (benthos, fish, aquatic plants) and their habitats: permanent or temporary loss of aquatic habitats, modification of water and sediment quality (inputs to the aquatic environment), degradation of fish habitat, possible modification of aquatic communities, impediments to the free movement of fish, detour of waterways at the mine site, and water crossings along the access road (mine site, road corridor);
- Migratory and non-migratory birds: Loss of bird habitat, noise disturbance to breeding pairs, broods and migratory birds, potential nest destruction and risk of nest abandonment;
- Caribou: potential habitat loss, noise disturbance, disturbance linked to human presence and activities, dust deposits on vegetation and habitat quality, barrier effect on migration ;
- Fauna and flora species in precarious situations: Potential loss of habitat or degradation due to the infrastructure footprint, dust/trampling, and noise disturbance.

The following Table 19-5 presents, on a preliminary basis, the potential impacts of the project's development and construction phases on the biological environment, as well as the mitigation measures that could be applied in response to apprehended impacts of both phases. The impact assessment related to the issues raised and the development of mitigation measures in consultation, in particular, with the Indigenous communities directly concerned and with stakeholders, will make it possible to validate, specify and complete this preliminary list.

Table 19-5: Preliminary list of potential impacts on biological environment and mitigation measures (development and construction phases)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation measures
Vegetation and Wetlands	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine site • Construction of airfield facilities at the mine site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their buildings (crushing plants, concentration plants, utilities, etc.) at the mine site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area • Construction of the container storage and handling area, buildings, drainage, etc. • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Loss, fragmentation and degradation of terrestrial wildlife and plant habitats, • Deterioration and alteration of ecological functions of terrestrial habitats, wetlands and water bodies, • Potential input of contaminants into terrestrial and aquatic habitats (e.g., dust deposition on vegetation and in waterbodies)	• Fencing to limit circulation outside of working areas • Installing culverts in a manner that does not impede the flow of water • Preliminary and regular inspection of the machinery to ensure its good condition and operation

Table 19-5: Preliminary list of potential impacts on biological environment and mitigation measures (development and construction phases) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation measures
Fish and Fish Habitat (fish, benthic invertebrates, aquatic plants) & Surface Water/ Sediment Quality	• Construction of the access road • Mine site preparation works • Separation plant site preparation works • Use and circulation of heavy machinery and fixed and mobile equipment (mine, road, port storage facilities, separation plant) • Presence of temporary infrastructures and facilities • Construction of permanent infrastructures and facilities • Water crossings along the road access • Potential temporary watercourse diversion and change to natural drainage • Presence of workers (including camp and waste, emissions and discharges) • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles) • Transport by ship for delivery of equipment to the mine site	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants • Permanent or temporary loss of aquatic habitats • Modification of water and sediment quality (inputs to the aquatic environment) • Degradation of fish habitat • Possible modification of aquatic communities • Impediment to the free movement of fish • Detour of waterways at the mine site, and water crossings along the access road • Erosion, risk of spills altering the aquatic environment or groundwater	• Localisation and preservation of all species sensitive habitats, including spawning grounds and rearing habitats for salmonids (Arctic char, Atlantic salmon, brook trout, lake trout) • Providing safe passage for fish for altered water bodies • Examining all alternatives in the planning phase to avoid/minimise the harmful alteration, disruption or destruction of fish habitat • Preliminary and regular inspection of the machinery to ensure its good condition and operation. Carry out preventive inspections of fuel storage areas and supply emergency kit for the recovery of petroleum products and hazardous materials available in vehicles, machinery and worksite facilities • Locate parking, washing and maintenance areas for machinery at least 60 m from any watercourse. Refuelling of machinery shall be carried out under constant supervision and at a minimum distance of 30 m from a watercourse. • Install a geomembrane downstream of crossings and around work areas to intercept SM particles, use culverts of sufficient size so as not to significantly narrow the flow sections at crossing points, prevent the transport of fine particles during work by installing sediment barriers around the edges of aquatic environments. • Prohibit fording in waterways (intermittent and permanent) • Submit a Compensation Plan for fish and fish habitats if residual impacts cannot be mitigated at the planning phase

Table 19-5: Preliminary list of potential impacts on biological environment and mitigation measures (development and construction phases) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation measures
Migratory Birds & Non-Migratory Birds	• Construction of the access road • Mine site preparation works • Separation plant site preparation works • Use and circulation of heavy machinery and fixed and mobile equipment (mine, road, port storage facilities, separation plant) • Presence of temporary infrastructures and facilities • Construction of permanent infrastructures and facilities • Presence of workers (including camp and waste, emissions and discharges) • Addition of light source • Separation plant site preparation (tree cutting, stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Construction and development of industrial facilities and their buildings • Construction of process residue storage facility • Construction of treated wastewater pipe and outlet (if any) • Construction of the rail siding (to be added to the existing rail between the separation plant and the port of Sept-Îles)	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants) • Permanent or temporary loss of nesting and rearing habitats • Noise disturbance to breeding pairs, broods and migratory birds • Light sources may alter the orientation of birds during migration	• Fencing to limit circulation outside of working areas in bird nesting habitats • Avoid any tree and brush cutting and circulation on undisturbed soil during nesting period • Preliminary and regular inspection of the machinery to ensure its good condition and operation • Avoid leaving vehicles running unnecessarily • Light sources facing downwards • Use of green light sources
Caribou	• Construction of the access road (and development of watercourse crossings) • Mine site preparation (stripping, excavation, grading, backfilling, development of drainage systems, etc.) • Improvements to the temporary camp facilities and fuel storage area at the mine Site • Construction of airfield facilities at the mine Site • Circulation of heavy machinery and fixed and mobile equipment at mine site and along the road corridor, delivery of equipment to the mine site, etc. • Construction of mine site infrastructure: retention basins, water treatment systems, storage areas, waste rocks piles, mine residue storage area, traffic lanes, etc.) • Construction and development of industrial plants and their buildings (crushing plants, concentration plants, utilities, etc.) at the mine site • Connexion of the seasonal access road to the port facilities • Circulation of heavy machinery and fixed and mobile equipment at the container storage and handling area	• Potential habitat loss, • Noise disturbance, • Disturbance linked to human presence and activities, • Dust deposits on vegetation and habitat quality, • Barrier effect on migration	• Fencing to limit circulation outside of working areas • Preliminary and regular inspection of the machinery to ensure its good condition and operation • Avoid leaving vehicles running unnecessarily • Modify the shoulders of the road along migration paths so that caribou can easily cross over • Adjust traffic level during spring and fall migration of caribou along the road to minimize disturbance • Prohibit all movement of equipment and people towards caribou observed within approximately 250 m of work sites or road access • Suspend noise activities (such as blasting) when a caribou is observed within 1 km, and drilling/crushing if a female with a calf is observed within 1 km. Wait 30 minutes before resuming suspended activities

19.2.1.4 Social Environment

The impacts of the Strange Lake Project on the social environment will be identified as part of the environmental assessment process. However, based on the information available, we expect that the project's development and construction phases are likely to have the following effects:

- Quality of life and human health: concerns and potential impacts of the project on quality of life and health in local and regional communities (such as reduced access to traditional food, possible contamination, or fear of contamination. On the other hand, the project will create jobs, provide business opportunities and increase purchasing power and availability of quality food in the local market);
- Social and economic aspects: socio-economic impacts of the project on local and regional communities (such as possible tensions, job creation, labour shortage, possible issues for the workers hired by the project and their families, contracts opportunities for local and regional businesses, development of unique technological expertise);
- Cultural heritage: the potential disturbance of archeological resources;
- Land use: disruption of the current use of the land and resources by Indigenous peoples and the general population, disturbance of the components and resources of the land valued by the various stakeholders, particularly those valued by Indigenous groups (notably caribou, Arctic charr and water quality of the George River and Ikadlivik Brook), modification of the landscape (visual degradation).

The following Table 19-6 presents, on a preliminary basis, the potential impacts of the project's development and construction phases on the social environment, as well as mitigation measures that could be applied in response to the impacts apprehended during both phases. The impact assessment related to the issues raised and the development of mitigation measures in consultation with the stakeholders, in particular the Indigenous communities directly concerned, will make it possible to validate, specify and complete this preliminary list.

Table 19-6: Preliminary list of potential impacts on the social environment and proposed mitigation measures (development and construction phases)

Critical environmental components	Sources of potential effects	Potential changes	Mitigation measures
Quality of Life and Human Health	• Access road construction • Mine site preparation and construction • Construction of container storage and handling area, buildings, drainage, etc. • Circulation of heavy machinery and fixed and mobile equipment on the mine site, along the road corridor and in the container storage and handling area/port facilities. • Transport by boat to deliver equipment to the mine site. • Hiring workers from local and regional communities • Contract awards in local and regional communities. • Preparing the site for the rare earth separation plant in Sept-Îles • Hiring workers from local and regional communities • Awarding contracts in local and regional communities	• Limited access to quality food from the land and traditional activities • Possible contamination of valued species • Reduction or cessation of traditional activities due to fears (proven or not) linked to the project. • Safety issues for people frequenting areas where work will be carried out during the development and construction phases. • Improved income for people hired as part of the project • Better access to quality store-bought food due to higher incomes	• Inform local and regional communities (Indigenous and non-Indigenous communities affected by the project) of the work schedule for both phases, and of potential risks to users. Throughout both phases, maintain contact with local and regional community authorities to enable them to identify any problems related to the use of the land by their population. • Inform Indigenous and non-Indigenous businesses and organizations (outfitters, adventure tourism businesses, protected area managers, etc.) of the work schedule and potential risks to users during both phases. Maintain contact with these people throughout the phases to enable them to identify potential problems related to their use of the territory. • Install signs indicating the presence of work zones close to travel routes, to inform users likely to travel there or engage in activities in the vicinity. • Fencing off work areas. • Maintain accessibility in areas not under construction throughout both phases. • In the event of temporary or permanent traffic restrictions on travel routes used by local and regional populations, plan bypass or new safe routes in conjunction with Indigenous communities' authorities or other relevant stakeholders. Inform the population concerned of these alternative or new routes. • Throughout both phases, regularly inform workers of the potential presence of users in the area concerned, particularly along the travel routes used. • Implement measures to limit dust propagation. • Implement measures to prevent and limit the impact of marine shipping on the activities of Indigenous groups in the bays concerned. • Carry out a prior, regular inspection of the machinery and equipment used to ensure that it is in good condition and operating correctly (so as not to generate excessive noise). • Restrict machinery traffic to work areas.

Table 19-6: Preliminary list of potential impacts on the social environment and proposed mitigation measures (development and construction phases) (continued)

Critical environmental components	Sources of potential effects	Potential changes	Mitigation measures
Quality of Life and Human Health (continued)			• If possible, isolate major noise sources with soundproofing materials. • Avoid implementing measures to facilitate wildlife harvesting activities by on-site workers throughout both phases. • Fund and support programs to promote healthy eating in communities. • Plan for site restoration after development and construction phases. • Implement an environmental monitoring program to ensure that mitigation measures are respected during both phases of the project.
Socio-Economic Conditions	• Access road construction • Mine site preparation and construction • Construction of container storage and handling area / port facilities, buildings, drainage, etc. • Circulation of heavy machinery and fixed and mobile equipment on the mine site, along the road corridor and in the container storage and handling area / port facilities. • Transport by boat to deliver equipment to the mine site • Hiring workers from local and regional communities • Awarding contracts in local and regional communities • Preparing the site for the rare earth separation plant in Sept-Îles • Hiring workers from local and regional communities • Awarding contracts in local and regional communities • Arrival and presence of out-of-town workers in the Sept-Îles region	• Job creation in local and regional communities, and improved incomes for those hired as part of the project • Contracts for local and regional companies • Community capacity building • Retention of young people and the workforce in local and regional communities through job creation and business development potential • Contributing to the labour shortage problem • Social issues for workers hired by the project and their families, • Tensions in local and regional communities concerning the project • Job creation in the Sept-Îles region and improved income for project employees • Contracts for companies in the Sept-Îles region • Contributing to the labour shortage problem in the Sept-Îles region • Social issues for workers hired by the project and their families • Contributing to the housing shortage in Sept-Îles and the region • Increased pressure on infrastructure in Sept-Îles and region • Tensions in local and regional communities concerning the project	• Preferential hiring of workers from local or regional communities, particularly within the indigenous communities concerned. • Implement proactive programs to increase the participation of women and community members in the workforce. • Give preference to local or regional companies that are competent to carry out the tasks requested in the call for tenders, before approaching companies based elsewhere in Quebec, Labrador or abroad. • Training of all Torngat employees, at all sites, to understand the cultures, history and strengths of Indigenous communities, in keeping with Torngat's values and objectives, while respecting the recommendations of the Truth and Reconciliation Commission.

Table 19-6: Preliminary list of potential impacts on the social environment and proposed mitigation measures (development and construction phases) (continued)

Critical environmental components	Sources of potential effects	Potential changes	Mitigation measures
Cultural Heritage	• Access road construction • Mine site preparation and construction • Construction of container storage and handling area / port facilities, buildings, drainage, etc. • Circulation of heavy machinery and fixed and mobile equipment on the mine site, along the road corridor and in the container storage and handling area / port facilities • Vessel traffic to deliver equipment to the mine site • Preparing the site for the rare earth separation plant in Sept-Îles	• Alteration or destruction of archaeological sites or resources during development work	• Take appropriate measures to avoid disturbing known archaeological resources. • If archaeological remains are discovered, work must be halted, measures taken to protect the site, and the appropriate authorities informed, i.e. the *Ministère de la Culture et des Communications du Québec (MCC)* in Quebec, the Provincial Archaeology Office of the Newfoundland and Labrador Department of Tourism, Culture, Arts and Recreation, and the Archaeology and Heritage Office of the Nunatsiavut Government.
Land Use	• Access road construction • Mine site preparation and construction • Construction of container storage and handling area / port facilities, buildings, drainage, etc. • Circulation of heavy machinery and fixed and mobile equipment on the mine site, along the road corridor and in the container storage and handling area / port facilities. • Ships for delivery of equipment to the mine site	• Disruption of current land and resource use by indigenous peoples and the general population, • Disturbance of the components and resources of the territory valued by the various stakeholders, in particular by Indigenous groups • Reduction or cessation of traditional activities due to fears (proven or otherwise) linked to the project. • landscape modification (visual degradation).	• Inform local and regional communities (Indigenous and non-Indigenous communities affected by the project) of the work schedule for both phases, and of potential risks to users. Throughout both phases, maintain contact with local and regional community authorities to enable them to identify any problems related to the use of the land by their population. • Inform Indigenous and non-Indigenous businesses and organizations (outfitters, adventure tourism businesses, protected area managers, etc.) of the work schedule and potential risks to users during both phases. Maintain contact with these people throughout the phases to enable them to identify potential problems related to their use of the territory. • Install signs indicating the presence of work zones close to travel routes, to inform users likely to travel there or engage in activities in the vicinity.

Table 19-6: Preliminary list of potential impacts on the social environment and proposed mitigation measures (development and construction phases) (continued)

Critical environmental components	Sources of potential effects	Potential changes	Mitigation measures
Land Use (continued)			• Fencing off work areas • Maintain accessibility in areas not under construction. • In the event of temporary or permanent traffic restrictions on travel routes used by local and regional populations, plan bypass or new safe routes in conjunction with indigenous community authorities or other relevant stakeholders. Inform the population concerned of these alternative or new routes. • Throughout both phases, regularly inform workers of the potential presence of users in the area concerned, particularly along the travel routes used. • Implement measures to limit dust propagation. • Implement measures to limit the impact of marine shipping on the activities (commercial, recreational, cultural, traditional, etc.) of Indigenous and non-Indigenous users in the bays concerned. • Carry out a prior and regular inspection of the machinery and equipment used to ensure that they are in good condition and operating correctly (so as not to generate excessive noise). • Restrict machinery traffic to work areas. • If possible, isolate the main sources of noise with absorbent materials. • Avoid implementing measures to facilitate wildlife harvesting activities by on-site workers throughout both phases. • Plan for site restoration after development and construction phases. • Implement an environmental monitoring program to ensure that mitigation measures are respected during both phases of the project.

19.2.2 Operational Phase (30-year operation)

19.2.2.1 Activities Likely to Impact Receiving Environment

19.2.2.1.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities /Port Facilities (northern project components)

At the mine site, the main activities likely to have impacts on the receiving environment during this phase of the project are:

- Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.).
- Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation).
- Activities related to the presence and use of infrastructure related to the mine site.
- The presence of workers (living environment and travel).
- Waste and mine residue management.
- Delivery of equipment and raw materials, shipment of product (concentrated ore).

Along the road access, the main activities are:

- Transportation by truck from the mine to the port: concentrate in superbags, wastes
- Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel)
- Road maintenance

At the container storage and handling facilities near Vale's Port (Option A) or port facilities at Voisey's Bay (Option C) are:

- Containers handling
- Fuel Handling
- Use of storage infrastructure (containers, fuel)
- Waste management
- Transport by ship from and to Vale's Port or Voisey's Bay

19.2.2.1.2 Separation Plant (Sept-Îles project component)

At the Separation plant, the main activities are:

- Transport by ship from and to Sept-Îles Port
- Transportation from the port to the separation plant site by existing rail of the material (superbags in containers).
- Separation of rare earths by acid baking and hydrometallurgical processes.
- Wastewater treatment and discharge.
- Air emissions treatment
- Presence of workers.
- Process residue management.

19.2.2.2 Physical Environment

The impacts associated with this phase on the physical environment of each project component are essentially:

- Greenhouse gases (GHGs): emission sources associated with fossil fuels, other GHG sources (i.e. refrigerants)
- Air quality: sources of atmospheric emissions (dust - particulate material, metallic dust, volatile organic compounds (VOCs), radioactive elements from the deposit). At the mine site, it should be noted that considering the proximity of the site to the provincial border, the study area will cover the areas potentially impacted on the Newfoundland and Labrador side.
- Acoustic environment: noise level and vibrations: machinery traffic, fixed (process) and mobile equipment, blasting, air and marine transportation.
- Soil quality: risks of contamination following accidental spills, effects of work on permafrost and soil subsidence (northern areas).
- Water and sediment regime: possible spills and sediment transport, potential sanitary and mining discharges.
- Water and sediment quality: possible temporary diversion of watercourses, erosion, risk of spills altering the aquatic environment or groundwater, risk of increased SS during maintenance work, etc.

The following Table 19-7 presents, on a preliminary basis, the potential impacts of the project's operation on physical environment, as well as mitigation measures that could be applied in response to the impacts apprehended during this phase. The impact assessment related to the issues raised and the development of mitigation measures in consultation, in particular, with the Indigenous communities directly concerned and with stakeholders, will make it possible to validate, specify and complete this preliminary list.

Table 19-7: Preliminary list of potential impacts on physical environment and mitigation measures (operational phase)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Greenhouse Gases	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrated ore). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port of Sept-Îles to the mine: fuel, equipment, raw materials and goods (all in containers except fuel). • Road maintenance. • Containers handling. • Fuel Handling • Use of storage infrastructure (containers, fuel) • Waste management. • Transport by ship from and to port facilities • Transport by ship from and to Sept-Îles Port. • Transportation from the port to the separation plant site by existing rail of the material (superbags in containers). • High purity separation of rare earths by acid baking and hydrometallurgical processes. • Wastewater treatment and discharge. • Air emissions treatment • Presence of workers. • Process residue management.	• Emission sources associated with fossil fuels, other GHG sources	• Develop and implement management plans for GHG emissions, according to the Best Available Technology (BAT) approach, while respecting legal and regulatory requirements. • Promote the use of low-emission (e.g., fuel-efficient) and zero-emission machinery and vehicles, according to the latest Environment and Climate Change Canada (ECCC) standards for on- and off-road vehicles. • Promote the use of generators that minimize fuel consumption and therefore have low atmospheric emissions. • Establish a procedure for shutting down heavy vehicles when they are not needed. • Implement a preventive maintenance and inspection program for equipment to ensure its proper functioning • Evaluate the feasibility of using renewable energy (e.g., solar, wind) to decarbonize the energy supply of operations and implement the best available solutions. • Inspect air conditioning, ventilation and heating equipment to ensure proper operation and limit the risk of refrigerant leaks, if any. • Study the feasibility and implement the best technologies for carbon capture and sequestration, such as carbon dioxide mineralization and revegetation of tailings sites. • Develop and implement a carbon management plan to reduce GHGs and eventually achieve net-zero goals by 2050, with a focus on renewable energy sources and non-fossil fuel transportation. In particular, promote air transport by airship instead of road transport, as soon as technically and economically feasible and approved by the authorities.

Table 19-7: Preliminary list of potential impacts on physical environment and mitigation measures (operational phase) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Air Quality	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrated ore). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Containers handling. • Fuel Handling • Use of storage infrastructure (containers, fuel) • Waste management. • Transport by ship from and to port facilities	• Sources of atmospheric emissions (dust - particulate material, metallic dust, volatile organic compounds (VOCs), • Radioactive elements from the deposit	• Develop and implement management plans for air emissions according to the Best Available Technology (BAT) approach, while respecting legal and regulatory requirements. • Use air treatment equipment to reduce dust emissions from industrial process equipment (mills, crushers, conveyors, furnace, etc.) or transportation. • Promote the use of low-emission (e.g., fuel-efficient) and zero-emission machinery and vehicles, according to the latest Environment and Climate Change Canada (ECCC) standards for on- and off-road vehicles. • Promote the use of generators that minimize fuel consumption and therefore have low atmospheric emissions. • Establish a procedure for shutting down heavy vehicles when they are not needed. • Implement a preventive maintenance and inspection program for equipment to ensure its proper functioning • Apply dust suppressants according to the conditions (meteorology) and development activities that have an impact on dust generation (e.g., operation of seasonal access roads) • Evaluate the feasibility of using renewable energy (e.g., solar, wind) to decarbonize the energy supply of operations and implement the best available solutions. • Carry out and update atmospheric and acoustic modelling to confirm compliance with provincial regulations at the property boundary (air quality) and at the surrounding sensitive receptors' location (noise, vibrations, etc.). • Dispose of excavated material in a manner that minimizes the dispersion of suspended matter

Table 19-7: Preliminary list of potential impacts on physical environment and mitigation measures (operational phase) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Acoustic Environment	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrate). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Containers handling. • Fuel handling • Use of storage infrastructure (containers, fuel) • Waste management. • Transport by ship from and to port facilities	• Increased noise level and vibrations: from machinery traffic, fixed (process) and mobile equipment, blasting and air transport	• Develop and implement management plans for ambient noise according to the Best Available Technology (BAT) approach, while respecting legal and regulatory requirements. • Use light vehicles that have effective mufflers to reduce noise level at the source • Establish a procedure for shutting down heavy vehicles when they are not needed. • Implement a preventive maintenance and inspection program for equipment to ensure its proper functioning • Evaluate the feasibility of using renewable energy (e.g., solar, wind) to decarbonize the energy supply of operations and implement the best available solutions. • Carry out and update atmospheric and acoustic modelling to confirm compliance with provincial regulations at the property boundary (air quality) and at the surrounding sensitive receptors' location (noise, vibrations, etc.).

Table 19-7: Preliminary list of potential impacts on physical environment and mitigation measures (operational phase) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Soil Quality	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrate). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Containers handling. • Fuel handling • Use of storage infrastructure (containers, fuel) • Waste management.	• Soil disturbance by stripping, blasting and excavation, • Risk of contamination due to accidental spills, • Effects of work on permafrost and soil subsidence • Soil disturbance by stripping, blasting and excavation • Risk of contamination due to accidental spills	• Develop and implement management plans for liquid effluents, mine and process residual materials, air emissions and ambient noise according to the Best Available Technology (BAT) approach, while respecting legal and regulatory requirements. • Implement a preventive maintenance and inspection program for equipment to ensure its proper functioning • Conduct preventive inspections of fuel storage areas and make an emergency petroleum and hazardous materials recovery kit available in machinery, vehicles and site facilities. • Evaluate the feasibility of using renewable energy (e.g., solar, wind) to decarbonize the energy supply of operations and implement the best available solutions. • Inspect air conditioning, ventilation and heating equipment to ensure proper operation and limit the risk of refrigerant leaks, if any. • Dispose of excavated material in a manner that minimizes the dispersion of suspended matter • Temporary mineral resource storage areas shall be constructed on a compacted gravel base surrounded by a collection ditch

Table 19-7: Preliminary list of potential impacts on physical environment and mitigation measures (operational phase) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Water and Sediment Regime	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrate). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Containers handling. • Fuel Handling • Use of storage infrastructure (containers, fuel) • Waste management. • Transport by ship	• Possible spills and sediment transport • Potential sanitary and mining discharges	• Develop and implement management plans for liquid effluents, mine and process residual materials, air emissions and ambient noise according to the Best Available Technology (BAT) approach, while respecting legal and regulatory requirements. • Implement a preventive maintenance and inspection program for equipment to ensure its proper functioning • Use air treatment equipment to reduce dust emissions from industrial process equipment (mills, crushers, conveyors, furnace, etc.) or transportation. • Apply dust suppressants according to the conditions (meteorology) and development activities that have an impact on dust generation (e.g., operation of seasonal access roads) • Conduct preventive inspections of fuel storage areas and make an emergency petroleum and hazardous materials recovery kit available in machinery, vehicles and site facilities. • Evaluate the feasibility of using renewable energy (e.g., solar, wind) to decarbonize the energy supply of operations and implement the best available solutions. • Optimize and control processes to maximize water reuse, reduce freshwater inputs and minimize discharges • Locate parking, washing and maintenance areas for machinery at least 60 m from any watercourse. Refuelling of machinery shall be carried out under constant supervision and at a minimum distance of 30 m from a watercourse. • Dispose of excavated material in a manner that minimizes the dispersion of suspended matter • Temporary mineral resource storage areas shall be constructed on a compacted gravel base surrounded by a collection ditch

Table 19-7: Preliminary list of potential impacts on physical environment and mitigation measures (operational phase) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Water and Sediment Quality	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrate). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Containers handling. • Fuel Handling • Use of storage infrastructure (containers, fuel) • Waste management. • Transport by ship	• Possible temporary diversion of watercourses • Erosion • Risk of spills altering the aquatic environment or groundwater • Risk of increased SS during maintenance work	• Develop and implement management plans for liquid effluents, mine and process residual materials, air emissions and ambient noise according to the Best Available Technology (BAT) approach, while respecting legal and regulatory requirements. • Use air treatment equipment to reduce dust emissions from industrial process equipment (mills, crushers, conveyors, furnace, etc.) or transportation. • Implement a preventive maintenance and inspection program for equipment to ensure its proper functioning • Apply dust suppressants according to the conditions (meteorology) and development activities that have an impact on dust generation (e.g., construction of seasonal access roads) • Conduct preventive inspections of fuel storage areas and make an emergency petroleum and hazardous materials recovery kit available in machinery, vehicles and site facilities. • Optimize and control processes to maximize water reuse, reduce freshwater inputs and minimize discharges • Locate parking, washing and maintenance areas for machinery at least 60 m from any watercourse. Refuelling of machinery shall be carried out under constant supervision and at a minimum distance of 30 m from a watercourse. • Dispose of excavated material in a manner that minimizes the dispersion of suspended matter • Temporary mineral resource storage areas shall be constructed on a compacted gravel base surrounded by a collection ditch

19.2.2.3 Biological Environment

The impacts associated with this phase on the biological environment of each project component are essentially:

- Vegetation and wetlands: loss, fragmentation and degradation of terrestrial wildlife and plant habitats, deterioration and alteration of ecological functions of wetlands and water bodies, potential input of contaminants into terrestrial habitats (e.g., dust deposition on vegetation).
- Aquatic fauna (benthos, fish, aquatic plants) and their habitats: permanent or temporary loss of aquatic habitats, modification of water and sediment quality (inputs to the aquatic environment), degradation of fish habitat, possible modification of aquatic communities, temporary impediments to the free movement of fish, possible temporary diversion of watercourses at the mine site, and water crossings along the access road (mine site, road corridor);
- Migratory and non-migratory birds: loss of bird habitat, noise disturbance to breeding pairs, broods and migratory birds, potential nest destruction and risk of nest abandonment.
- Caribou: potential habitat loss, noise disturbance, disturbance linked to human presence and activities, dust deposits on vegetation and habitat quality, barrier effect on migration ;
- Fauna and flora species in precarious situation: potential loss of habitat or degradation due to the infrastructure footprint, dust/trampling, and noise disturbance.

The following Table 19-8 presents, on a preliminary basis, the potential impacts of the project's operational phase on the biological environment, as well as the mitigation measures that could be applied in response to apprehended impacts for this phase. The impact assessment related to the issues raised and the development of mitigation measures in consultation, in particular, with the Indigenous communities directly concerned and with stakeholders, will make it possible to validate, specify and complete this preliminary list.

Table 19-8: Preliminary list of potential impacts on biological environment and mitigation measures (operational phase)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation[35]
Vegetation and Wetlands	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrated ore). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Containers handling. • Fuel Handling • Use of storage infrastructure (containers, fuel) • Waste management. • Transport by ship from and to port facilities •Transportation from the port to the separation plant site by existing rail of the material (superbags in containers). •High purity separation of rare earths by acid baking and hydrometallurgical processes. •Wastewater treatment and discharge. •Air emissions treatment •Presence of workers. •Process residue management	• Loss, fragmentation and degradation of terrestrial wildlife and plant habitats • Deterioration and alteration of ecological functions of wetlands and water bodies • Potential input of contaminants into terrestrial habitats (e.g., dust deposition on vegetation)	• Fencing to limit circulation outside of working areas • Prohibit fording of streams (intermittent and permanent) • Avoid movement of any vehicle or construction equipment within 20 m of a permanent watercourse or 5 m of an intermittent watercourse and, if such movement is necessary, divert water flowing in ruts to a vegetated area at least 20 m from a watercourse • Remove solids from domestic wastewater with a treatment unit • Preliminary and regular inspection of the machinery to ensure its good condition and operation

[35] In addition to these measures, the ones listed in the previous section are also included. Indeed, these measures allow for the reduction of sources of contamination in the air, water and soil in addition to reducing the impact of noise.

Table 19-8: Preliminary list of potential impacts on biological environment and mitigation measures (operational phase) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Fish and Fish Habitat (fish, benthic invertebrates, aquatic plants) & Surface Water/ Sediment Quality	• Excavation of the pit • Transportation of the mineral resource along the road access, shipment of goods, raw materials • Treatment and concentration of the mineral resource that will include water management and treatment, discharges (effluent) • Rare earth separation potentially requiring wastewater treatment and discharge • Mine residues and waste rock management • Separation plant residue management • Mining and transportation activities • Use and circulation of heavy machinery and fixed and mobile equipment (mine, road, port storage facilities, separation plant) • Presence of workers (including camp and waste, emissions and discharges) • Transport by ship from and to Sept-Îles Port • Transportation from the port to the separation plant site by existing rail of the material (superbags in containers). • Separation of rare earths by acid baking and hydrometallurgical processes. • Wastewater treatment and discharge (if required). • Air emissions treatment • Presence of workers. • Process residue management.	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants • Permanent or temporary loss of aquatic habitats • Modification of water and sediment quality (inputs to the aquatic environment) • Degradation of fish habitat • Possible modification of aquatic communities • Impediment to the free movement of fish • Detour of waterways at the mine site, and water crossings along the access road • Erosion, risk of spills altering the aquatic environment or groundwater • Introduction of aquatic invasive species	• Preliminary and regular inspection of the machinery to ensure its good condition and operation. Carry out preventive inspections of fuel storage areas and supply emergency kit for the recovery of petroleum products and hazardous materials available in vehicles, machinery and worksite facilities • Application of all mitigation measures to protect the air, water, sediment and soil quality, such as the use of dust suppressants, water treatment, and implementation of measures related to contamination hazards at the mine site and along the road corridor (transportation) • Environmental monitoring and follow-up programs, • For expansion/stabilisation/maintenance work: see Construction phase mitigation measures to minimise the harmful alteration, disruption or destruction of fish habitat, and protect air, water, sediment and soil quality.

Table 19-8: Preliminary list of potential impacts on biological environment and mitigation measures (operational phase) (Cont'd)

Critical environmental components	Sources of potential effects	Potential Changes	Mitigation
Migratory Birds & Non-Migratory Birds	• Excavation of the pit • Transportation of the mineral resource along the road access, shipment of goods, raw materials • Treatment and concentration of the mineral resource that will include water management and treatment, discharges (effluent) • Rare earth separation potentially requiring wastewater treatment and discharge • Mine residue and waste rock management • Separation plant residue management • Mining and transportation activities • Use and circulation of heavy machinery and fixed and mobile equipment (Mine, Road) • Presence of workers (including camp and waste, emissions and discharges) • Addition of light source • Transport by ship from and to Sept-Îles Port • Transportation from the port to the separation plant site by existing rail of the material (superbags in containers). • Separation of rare earths by acid baking and hydrometallurgical processes. • Wastewater treatment and discharge (if required). • Air emissions treatment • Presence of workers. • Process residue management.	• Alteration of ecological functions of wildlife habitats in the ecosystem (terrestrial habitats, wetlands and water bodies) via potential input of contaminants • Permanent or temporary loss of nesting habitats • Noise disturbance to breeding pairs and migratory bird • Light sources may alter the orientation of birds during migration	• Preliminary and regular inspection of the machinery to ensure its good condition and operation to reduce noise disturbance during nesting and brood rearing • Avoid leaving vehicles running unnecessarily • If new working areas are required, proceed to nest searches and avoid disturbing nesting areas before fledging if active nests found • Light sources facing downwards • Use of green light sources

Table 19-8: Preliminary list of potential impacts on biological environment and mitigation measures (operational phase)(Cont'd)

Critical environmental components	Sources of potential effects	Potential changes	Mitigation
Caribou	• Excavation of the pit and transportation of the mineral resource (blasting, excavation, movement of heavy machinery and fixed and mobile equipment, materials etc.). • Treatment and concentration of the mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • Activities related to the presence and use of infrastructure related to the mine site. • The presence of workers (living environment and travel). • Waste and mine residue management. • Delivery of equipment and raw materials, shipment of product (concentrate). • Transportation by truck from the mine to the port: concentrate in superbags, wastes • Transportation by truck from the port to the mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Containers handling. • Fuel handling • Use of storage infrastructure (containers, fuel) • Waste management. • Transport by ship from and to port facilities	• Noise disturbance • Disturbance linked to human presence and activities • Dust deposits on vegetation and habitat quality • Barrier effect on migration	• Fencing to limit circulation • Preliminary and regular inspection of the machinery to ensure its good condition and operation • Avoid leaving vehicles running unnecessarily • Prohibit all movement of equipment and people towards caribou observed within approximately 250 m of work sites or road accesses • Suspend noise activities (such as blasting) when a caribou is observed within 1 km, and drilling/crushing if a female accompanied by a calf is observed within 1 km. Wait 30 minutes before resuming suspended activities • Avoid any tree and brushcutting and surface alteration during the bird nesting and rearing period

19.2.2.4 Marine Environment

The impacts associated the marine shipping component of the Strange Lake Project is expected to be neglible as the annual number of transport vessels planned is between 5 and 10. Nevertheless, there are potential incidental risks and cumulative effects associated with marine transport that could have an impact on the marine environment. The known risks associated with ship movements on the marine environment are essentially:

- **Noise disturbance :** ship noise has been observed to mask the acoustic environment of fish species and affect the behavior of fish and marine mammals and may cause avoidance or attraction of certain species. Underwater noise can mask the auditory range of whales, diminishing their ability to perceive sounds in their environment.
- **A source of pollution and a pathway for the introduction of invasive species :** ballast water discharge can contain organisms, bacteria and various effluents present in the ballast from the water source. Ballast water can be a pathway for the introduction of invasive species, when not treated with an approved method, especially if the ship comes from overseas.

- **Hydrocarbon spill:** an oil spill is the main accidental event likely to affect marine mammals and seabirds, in particular. Seals and whales can be exposed to an oil spill either directly or by feeding on oiled prey. In most cases, they can avoid a spill. Harbour seals are the most vulnerable marine mammals, as they are the most likely to run aground on coastlines that could be contaminated by oil.
- **Concentrate spill (failure of the container handling system or loss during transport):** marine environment may be contaminated by metals at the location of the spill.
- **Collision with marine mammals:** Collisions occur primarily at high speeds when marine mammals are less alert, such as during surface resting, feeding, nursing, or breeding. Collisions with whales, seals and other marine mammals can lead to mortality. In fish, flight behaviour would enable them to avoid areas close to noise sources.

The following Table 19-9 presents, on a preliminary basis, the potential impacts of the Project's construction and operational phases on the marine environment, as well as the mitigation measures that could be applied in response to apprehended impacts. The impact assessment related to the issues raised and the development of mitigation measures in consultation with the Indigenous communities directly concerned, in particular, and with stakeholders, will make it possible to validate, specify and complete this preliminary list.

Table 19-9: Preliminary list of potential impacts of marine shipping on marine environment and mitigation measures (construction and operational phases)

Critical environmental components	Sources of potential effects	Potential changes	Mitigation
Marine Fauna	• Ship noise disturbance • Collision with marine mammals • Ballast water • Hydrocarbon spill (transport, transshipment, handling, and storage) • Concentrate spill (generally due to failure of the container handling system or loss during transport or handling of the containers of concentrate).	• Underwater noise can affect the life cycle of marine mammals. • Underwater noise may cause avoidance or attraction of certain species. • Collisions with marine mammals can lead to mortality. • Ballast waters can be a source of pollution and a pathway for the introduction of invasive species. • Marine mammals and birds can be exposed to an oil spill either directly or by feeding on oiled prey (and become part of the food chain). • Metal contamination in marine environment.	• The transport ship, if possible, would be fitted with propellers designed to reduce cavitation[36] to minimize noise during travel. • Speed reduction in bays will reduce the intensity and propagation of noise in the water and reduce risks of collisions (up-to-date *Notices to Mariners* will be followed) (Collisions occur primarily at high speeds when marine mammals are less alert, such as during surface resting, feeding, nursing, or breeding. Echolocation and communication between individuals are primarily affected by underwater noise). • Required procedures for ballast water discharge /exchange will be followed (include mid-ocean ballast water exchange, and ballast water approved treatments). • Distribution infrastructures and reservoirs will be designed in accordance with existing standards (including those of the American Petroleum Institute (API) re reduce the risk of oil spills. • A contingency plan will be put in place based on "worst-case" fuel spill scenarios. • Vigorous standards will be applied to minimize the risk of spills into the environment.

Sources: De Robertis and Handegard 2013; Drake et al., 2020; ICMM, 2021; ROMM, 2021, Rostad et al., 2006; Slabbekoorn et al., 2010; Transport Canada, 2017, 2019

[36] Cavitation is the main source of noise produced by large ships, due to the bursting of bubbles around propellers.

19.2.2.5 Social Environment

In terms of the social environment, the impacts apprehended during the operational phase are essentially the same as during the development and construction phases. However, given the longer duration of this phase, the intensity of the effects is likely to be higher. Thus, regarding the social environment, the potential impacts related to this phase are:

- Quality of life and human health: concerns and potential impacts of the Strange Lake Project on quality of life and human health in local and regional communities (such as reduced access to traditional food, contamination or fear of contamination);
- Social and economic aspects: socio-economic impacts of the project on local and regional communities (such as possible tensions, job creation, labour shortage, possible issues for the workers hired by the project and their families (fly-in fly-out at the mine site and at the separation plant), contracts for local and regional companies; housing scarcity and rising rental costs in Sept-Îles due to the arrival of outside workers at separation plant);
- Cultural heritage: the potential disturbance of archeological resources;
- Land use: disturbance of the current use of the land and resources by Indigenous peoples and the general population, disruption of the components and resources of the land valued by the various stakeholders, particularly those valued by Indigenous groups (notably caribou, arctic charr and water quality in George River and Ikadlivik Brook, Konrad Brook and Kogaluk Brook), modification of the landscape (visual degradation).

The following Table 19-10 presents, on a preliminary basis, the potential impacts of the project's operational phase on the social environment, as well as the mitigation measures that could be applied in response to apprehended impacts. The impact assessment related to the issues raised and the development of mitigation measures in consultation with the Indigenous communities directly concerned, in particular, and with stakeholders, will make it possible to validate, specify and complete this preliminary list.

Table 19-10: Preliminary list of potential impacts on the social environment and proposed mitigation measures (operation phase)

Critical environmental components	Sources of potential effects	Potential changes	Mitigation measures
Quality of Life and Human Health	• Pit excavation and mineral resource transport (blasting, excavation, moving heavy machinery, fixed and mobile equipment, materials, etc.). • Treatment and concentration of mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • The presence of workers (living environment and travel). • Waste and tailings management. • Delivery of equipment and raw materials, shipment of product (ore concentrate). • Trucking from mine to port: concentrate in super-bags, waste materials • Truck transport from port to mine: fuel, equipment, raw materials and goods (all in containers except fuel) • Road maintenance. • Container handling. • Fuel handling	• Reduced access to quality food from the land and traditional activities • Possible contamination of valued species • Reduction or cessation of traditional activities due to fears (proven or otherwise) linked to the project. • Safety issues for people frequenting areas where work will be carried out during the operation phase • Improved income for people hired as part of the project • Better access to quality downmarket food thanks to higher incomes	• Inform local and regional communities (Indigenous and non-Indigenous communities affected by the project) of the work schedule for this phase, and of any potential risks to users. Throughout the phase, maintain contact with local and regional community authorities to enable them to identify any problems concerning land use by their population. • Inform Indigenous and non-Indigenous businesses and organizations (outfitters, adventure tourism businesses, protected area managers, etc.) of the work schedule and potential risks to users during this phase. Maintain contact with these people throughout the operation phase, to enable them to identify potential problems related to their use of the territory. • Install signs indicating the presence of work or operation areas close to traffic routes, to inform users likely to travel there or engage in activities in the vicinity.

Table 19-10: Preliminary list of potential impacts on the social environment and proposed mitigation measures (operation phase) (continued)

Enhanced environmental components	Sources of potential effects	Potential changes	Mitigation measures
Quality of Life and Human Health (continued)	• Use of storage infrastructure (containers, fuel) • Waste management • Boat transport to and from the port of Vale or Voisey's Bay • Hiring workers from local and regional communities • Awarding contracts in local and regional communities • Boat transport to and from the port of Sept-Îles • Transport from the port to the rare earth separation plant site by existing rail (superbags in containers). • High-purity separation of rare earths by acid firing and hydrometallurgical processes. • Wastewater treatment and discharge. • Treatment of atmospheric emissions • Presence of workers. • Process residue management. • Hiring workers from local and regional communities • Awarding contracts in local and regional communities		• Fencing off work areas • Maintain accessibility in areas not targeted for construction work throughout the construction phase. • In the event of temporary or permanent interruption of traffic on the travel routes used, plan bypass routes or new safe routes in conjunction with the authorities of the Indigenous communities or other stakeholders concerned. Inform the population concerned of these alternative or new routes. • Throughout the phase, regularly inform workers of the potential presence of users in the area concerned, particularly along the access routes used. • Implement measures to limit dust propagation. • Implement measures to limit the impact of marine shipping on the activities of Indigenous groups in the bays concerned. • Carry out a prior and regular inspection of the machinery and equipment used to ensure that they are in good condition and operating correctly (so as not to generate excessive noise). • Restrict machinery traffic to work areas. • If possible, isolate the main sources of noise with absorbent materials. • Avoid implementing measures to facilitate wildlife harvesting activities by workers throughout this phase. • Funding and support for programs to promote healthy eating in communities. • Implement an environmental monitoring program to ensure that mitigation measures are respected during this phase of the project.

Table 19-10: Preliminary list of potential impacts on the social environment and proposed mitigation measures (operation phase) (continued)

Enhanced environmental components	Sources of potential effects	Potential changes	Mitigation measures
Socio-Economic Conditions	• Hiring workers from local and regional communities • Awarding contracts in local and regional communities • Hiring workers from local and regional communities to operate the rare earth separation plant in Sept-Îles • Awarding contracts in local and regional communities • Arrival and presence of out-of-town workers in the Sept-Îles region	• Job creation in local and regional communities, and improved incomes for those hired as part of the project • Contracts for local and regional companies • Community capacity building • Retention of young people and the working population in local and regional communities due to job creation and the development of business opportunities • Contributing to the labour shortage problem • Social issues for workers hired by the project and their families, • Tensions in local and regional communities concerning the project • Job creation in the Sept-Îles region and improved income for project employees • Contracts for companies in the Sept-Îles region • Community capacity building • Retention of young people and the active population in the Sept-Îles region due to job creation and the development of opportunities for local and regional businesses. • Contributing to the labour shortage problem in the Sept-îles region • Social issues for workers hired by the project and their families • Contributing to the housing shortage in Sept-Îles and the region • Increased pressure on Sept-Îles and area infrastructures • Tensions in local and regional communities concerning the project	• Preferential hiring of workers from local or regional communities, particularly within the Indigenous communities concerned • Implement proactive programs to increase the participation of women and all community members in the workforce. • Give preference to local or regional companies that are competent to carry out the tasks requested in the call for tenders, before approaching companies based elsewhere in Quebec, Labrador or abroad. • Training of all Torngat employees, at all sites, to understand the cultures, history and strengths of Indigenous communities, in keeping with Torngat's values and objectives, while respecting the recommendations of the Truth and Reconciliation Commission. • Collaborate with local stakeholder to increase local infrastructure capacity, in particular in terms of housing

Table 19-10: Preliminary list of potential impacts on the social environment and proposed mitigation measures (operation phase) (continued)

Enhanced environmental components	Sources of potential effects	Potential changes	Mitigation measures
Cultural Heritage	• Pit excavation and mineral resource transport (blasting, excavation, moving heavy machinery, fixed and mobile equipment, materials, etc.). • Road maintenance (excavation of borrow pits)	• Alteration or destruction of archaeological sites or resources during development work	• Take appropriate measures to avoid disturbing known archaeological resources • If archaeological remains are discovered, work must be halted, measures taken to protect the site, and the appropriate authorities informed, i.e. the *Ministère de la Culture et des Communications du Québec* (MCC) in Quebec, the Provincial Archaeology Office of the Newfoundland and Labrador Department of Tourism, Culture, Arts and Recreation, and the Archaeology and Heritage Office of the Nunatsiavut Government.
Land Use	• Pit excavation and mineral resource transport (blasting, excavation, moving heavy machinery, fixed and mobile equipment, materials, etc.). • Treatment and concentration of mineral resource by physical processes (crushing, grinding, X-ray sorting, electromagnetic separation, flotation). • The presence of workers (living environment and travel). • Waste and tailings management. • Delivery of equipment and raw materials, shipment of product (ore concentrate). • trucking from mine to port: concentrate in super-bags, waste materials. • truck transport from port to mine: fuel, equipment, raw materials and goods (all in containers except fuel). • road maintenance. • Container handling. • Fuel handling	• Disruption of current land and resource use by Indigenous peoples and the general population, • Disturbance of the components and resources of the territory valued by the various stakeholders, in particular by Indigenous groups • Reduction or cessation of traditional activities due to fears (proven or not) linked to the project. • landscape modification (visual degradation).	• Inform local and regional communities (Indigenous and non-Indigenous communities affected by the project) of the work schedule for this phase, and of any potential risks to users. Throughout the phase, maintain contact with local and regional community authorities to enable them to identify any problems concerning the use of the land by their population. • Inform Indigenous and non-Indigenous businesses and organizations (outfitters, adventure tourism businesses, protected area managers, etc.) of the work schedule and potential risks to users during this phase. Maintain contact with these people throughout the phases to enable them to identify potential problems related to their use of the territory. • Install signs indicating the presence of work or operation areas close to travel routes, to inform users likely to travel there or engage in activities in the vicinity. • Fencing off work areas • Maintain accessibility in areas not targeted for work throughout the phase. • In the event of temporary or permanent disruption to traffic on the routes used, plan bypass routes or new safe routes in conjunction with indigenous community authorities or other relevant stakeholders. Inform the population concerned of these alternative or new routes.

Table 19-10: Preliminary list of potential impacts on the social environment and proposed mitigation measures (operation phase) (continued)

Enhanced environmental components	Sources of potential effects	Potential changes	Mitigation measures
Land Use (continued)	• Use of storage infrastructure (containers, fuel) • Waste management. • Boat transport to and from the port of Vale or Voisey's Bay		• Throughout the phase, regularly inform workers of the potential presence of users in the area concerned, particularly along the travel routes used. • Implement measures to limit dust propagation. • Implement measures to limit the impact of marine shipping on the activities of indigenous groups in the bays concerned. • Carry out a prior and regular inspection of the machinery and equipment used to ensure that they are in good condition and operating correctly (so as not to generate excessive noise). • Restrict machinery traffic to work areas. • If possible, isolate the main sources of noise with absorbent materials. • Avoid implementing measures to facilitate wildlife harvesting activities by on-site workers during this phase. • Implement an environmental monitoring program to ensure that mitigation measures are respected during this phase of the project.

19.2.3 Closure and Restoration Phase

19.2.3.1 Activities Likely to Impact Receiving Environment

19.2.3.1.1 Strange Lake Mine Site, Road Corridor, Container Storage and Handling Facilities (northern project components)

At the mine site, the main activities likely to have impacts on the receiving environment during this phase of the project are:

- Progressive dismantling activities of the project infrastructures
- Site restoration
- Movement of heavy machinery, mobile and fixed equipment, materials
- Presence of workers (living environment and travel)

The restoration phase aims at restoring the site to its natural state and will mainly generate positive impacts on the receiving environment. The work that will be carried out during this phase will be like that of the development and construction phases; the sources of impacts and mitigation measures will therefore be similar, with the exception that the vehicles and machinery used at this time should be mostly, if not entirely, of the zero-emission type (post-2050).

In addition, this work will aim to rehabilitate the receiving environment as well as the functions of the biophysical and social environments, i.e., air, soil, water and sediment quality, wildlife and plant habitats (plant recovery, end of disturbance), occupations and uses that prevailed before the project. However, socio-economic impacts resulting from the loss of jobs will require the implementation of relocation measures and support for the demobilized workforce.

Access road: after the mine restoration and rehabilitation phases, should the communities request it, the road might be either given to the communities for providing better access to their territories, or used as a basis for a future public road. If the reusing or upgrading of the road is not desired, the road corridor would be subject to a restoration to its natural state.

Container storage and handling facilities (Vale's Port or Voisey's Bay Port): after the mine restoration and rehabilitation phases, this area could be transferred to the port operator or dismantled and restored, depending on the result of consultations with local communities.

19.2.3.1.2 Separation Plant (Sept-Îles project component)

At the separation plant , the main activities likely to have impacts on the receiving environment during this phase of the project are:

- Progressive dismantling activities of the project infrastructures
- Site restoration, including for the residue storage facility
- Movement of heavy machinery, mobile and fixed equipment, materials
- Presence of workers (living environment and travel)

19.2.3.2 Physical, Biological and Social Environments

The impacts and mitigation measures associated with this closure and restoration phase are generally similar to those of the construction phase.

19.2.4 Environmental Monitoring and Follow-up Programs

In parallel with the application of specific and general mitigation measures, the development of rigorous environmental surveillance and monitoring programs will make it possible to reduce the apprehended negative impacts of the project. In addition, the implementation of mitigation measures, such as the use of dust suppressants, will make it possible to limit the disturbances.

Furthermore, additional studies during the development and construction phases and continuously during the operational phase will make it possible to identify and apply appropriate mitigation measures to adequately protect the sensitive components of the receiving environment (physical, biological, social). Finally, the consultations already initiated and those that will follow will make it possible to adequately consider the concerns of the Indigenous communities.

20 Potential Changes to the Environment (federal lands, other provinces or land)

The Strange Lake Rare Earth Mining Project is located in Quebec for the mine site, the airstrip and the separation plant. The seasonal road is partly in Quebec (for 18 km) while the remaining will be in Labrador and/or Labrador Inuit Land (LIL) depending on the option chosen. There were four road options consider to the seasonal road but only two were selected for further studies (Option A vs Option C). Both options are starting at the mine site and ending on the eastern coast of Labrador (either Anaktalak Bay for Option A , or Voisey's Bay for Option C).

20.1 Impacts of the Mine Site (mine, concentration plant):

Water : No effluent or runoff water from the Project in Quebec will reach the Newfoundland and Labrador territory. All discharges (see Section 24.3) from the mine site will be directed towards the receiving environment of the mining activities.

Air quality: Considering the proximity of the provincial boundary of Labrador with respect to Torngat Metals' mining claims, it is possible that the Mining Project air emissions reach Newfoundland and Labrador. Dust, particulate matter, metals, Volatile Organic Compounds, REE and radioactive elements, CO_2, CO, NOx and SOx are among the parameters that will need to be monitored. According to the meteorological data collected between 2011 and 2014 (see Section 14.1.1), prevailing winds are from the south-west direction. New data taken from the meteoroligical station installed in 2023 will confirm the direction and intensity of the winds. A sampling campaign will be completed at the mine site in 2025. This will establish initial contaminant concentrations over a representative period (i.e. for more than one season over a year). The initial concentrations of contaminants present in the sampling campaign at the mining site will be used for the air emissions modeling activities for the project northern components (mining site & concentration plant, access road, port facilities).

Accoustic environment: disturbance of the peace and quietness (increased noise and vibration level) for the population, impact on caribou, birds (breeding pair and migratory).

Social and health: impact on valued fauna and flora used by Indigenous group, reduced access to traditional food, possible contamination or fear of contamination, potential disturbance to archeological resources, disruption of current and projected land use and resources use by Indigenous people and the general population, job creation in local and regional communities, contracts for local and regional companies, impact for workers hired by the project and their families, tension in local and regional communities concerning the project, possible contamination of valued species, safety issues for people using the areas where the work will be carried out, impact of lay-offs on the local and regional communities after the closure.

20.2 Impact of the Road

The four road options are the following:

- Option A is the alignment from the mine site to the port of Vale, in Anaktalak Bay.
- Option B is a Quebec only access road and linked the mine site to the city of Schefferville.
- Option C1 and C2 are the alignments from the mine site to Voisey's Bay.
- Option D is the alignment from the mine to the smallwood reservoir, where it would join the NF provincial road system.

Option B and D were not brought forward as they were associated with significant environmental impacts due to their total length (380 km for Option B and 290 km for Option D), that also increases the potential number of water crossings. In addition, due to the length of the road, an overnight camp would have to be built along the road for health and safety concerns, thus having a significant impact on land use by indigenous communities. In addition, both of those options ended in inhabited areas, giving the opportunity for human establishment in northern territory currently difficult to access. In contrast, Options A and C are both shorter (less than 200 km), with significantly less water crossings, do not cross or come close to any habituated areas and are economically feasible. Option C (C1 and C2) would require building a Marshalling Yard with a floating dock.

Soil quality: permafrost in the north could be affected along the road corridor, risk of contamination due to accidental spills (oil, hydrocarbure)

Water quality: impact of accidental spills, impact of quarries along the road. Complete and thorough inventories of wetlands, watercourses and water bodies will be carried out. Hence the wetlands, watercourses and water bodies that could be potentially affected by the project will be well documented. In addition, surveys will be conducted in order to update the data previously collected. Those will be conducted to comply with all guidelines, for all biophysical components and this, for both the mine site and the separation plant, as well as the access road. All potential impact to the water quality will be addressed and will be comprehensively detailed in the Environmental and Social Impact Assessment study.

Air quality: It should be noted that there are no anthropogenic activities along the portion of the road that will be used in Newfoundland and Labrador. In addition, the access road will be used only in winter, which will limit dust generation when concentrates are transported in closed containers. It is anticipated that the initial ambient air quality conditions observed at the mine site will also be used for the new access road. The data from the mine and port facilities site will be used for the air emissions modeling activities for the project northern components.

Accoustic environment: disturbance of the peace and quietness (increased noise and vibration level) for the population, impact on caribou, birds (breeding pair and migratory).

Social and health: impact on valued fauna and flora used by Indigenous group, reduced access to traditional food, possible contamination or fear of contamination, potential disturbance to archeological resources, disruption of current and projected land use and resources use by Indigenous people and the general population, job creation in local and regional communities, contracts for local and regional companies, impact for workers hired by the project and their families, tension in local and regional communities concerning the project, possible contamination of valued species, safety issues for people using the areas where the work will be carried out, impact of lay-offs on the local and regional communities after the closure.

Risk of collision with wildlife

Visual disturbance of the landscape.

20.3 Impact of the Port

Air Quality: A sampling campaign will be completed at the potential port facilities in 2025. As stated earlier, the data from the mine and port facilities site will be used used for the air emissions modeling activities for the project northern components.

As exposed in Section 14.3.3.2, a full Marine Baseline Program will occur in 2024 in Voisey's Bay.

Water quality : contamination by accidental oil and hydrocarbure spills, effluent from the port

Acoustic environment: disturbance of the peace and quietness (increased noise and vibration level) for the population, impact on caribou, birds (breeding pair and migratory)

Social and health: impact on valued fauna and flora used by Indigenous group, reduced access to traditional food, possible contamination or fear of contamination, potential disturbance to archeological resources, disruption of current and projected land use and resources use by Indigenous people and the general population, job creation in local and regional communities, contracts for local and regional companies, impact for workers hired by the project and their families, tension in local and regional communities concerning the project, possible contamination of valued species, safety issues for people using the areas where the work will be carried out, impact of lay-offs on the local and regional communities after the closure.

20.4 Impact of Marine Shipping Road

Currently accepted marine shipping route(s) for similar vessels will be used for transporting the concentrate to Sept-Îles and adherence to current guidelines/regulations will be ensured. The number of vessels related to this project could be up to 15 (concentrate/container ships + fuel/tanker ships) per year, in addition to current maritime traffic, which represents about 3 to 4.5% of the total annual maritime traffic along the Labrador coast, and approximately 0.3% of annual maritime traffic along the St. Lawrence River (see section 9.4.2). If Option C is pursued, the new maritime route leading from the dock to the existing maritime route will undergo an environmental assessment.

Water quality : impact of the ballast water as pathway for invasive species bacteria and effluents, contamination by oil or hydrocarbure

Acoustic environment: Although ships noises are temporary and limited to the duration of the emissions, they can be transmitted through the water on long distance and may impact marine fauna: avoidance or attraction, behavior, mammals life cycle.

Collision risks for marine mammals

Social and health: Impact on “food, social and ceremonial” fisheries and commercial fisheries, impact on Atlantic salmon at-sea migration patterns, contamination or fear of contamination

20.5 Others

Accidental spill (road and port): In order to prevent accidents, ensure worker safety and protect the environment, a team of experts with various backgrounds (engineers, operators, technicians, environmental and health & safety) will identify and assess potential hazards and operational issues for each sites. Among the scenarios under study, an accidental spill will be one of the many risks assessed. This scenario may include equipment failure, human error or unexpected chemical reactions. The final step is to propose ways of mitigating these risks. All the conclusions and recommendations of the HAZOP (Hazard and Operability Study) analysis will be documented and serve as a guide for making any necessary changes.

REE exposition: All available litterature will be examined to evaluate the risk of REE, and radioactive substances, exposure to workers. Though levels are low relative to Uranium mines, potential exposure of workers will be evaluated and appropriate precautions will be put in place to minimize exposure during operations. Safe work plans will also be established to ensure that appropriate PPE is used and that all reasonable mitigation measures are put in place. Levels will be quantified in the various components that will be transported and stored (ex. REE concentrate, purification residus) to inform proper transport and storage options. Miners can be exposed to increased REE levels in occupational environment.

All potential changes to the environment will be addressed on a large-scale study area and will be comprehensively detailed in the Environmental and Social Impact Assessment study (ESIA), including the mitigation measures and the environmental monitoring and follow-up programs for each phase of the project, accordingly, to reduce the significance of the adverse effects of the project. Both analysis and identification of mitigation measures will be carried out in collaboration with all parties implicated in the conservation of the protected areas.

21 Anticipated Changes and Impacts on Indigenous Communities - Physical and Cultural Heritage, Use of Lands and Resources, Historical, Archaeological Significance

Since the Strange Lake Project has not yet been the subject of an impact assessment, its effects on Indigenous communities are not yet clearly defined. However, based on available data and experience from previous studies, certain potential impacts can be expected. Development, construction, operational, as well as closure and restoration phases might have different impacts on the social environment. For the mining site, the road corridor and the storage and handling / port facilities, most of these impacts would be felt by the Indigenous groups: the Nunavik Inuit (mainly from the communities of Kangigsualujjuaq and Kuujjuaq), the Naskapi Nation of Kawawachikamach (the community of Kawawachikamach), the Quebec Innu (mainly the communities of Matimekush - Lac John but also Uashat mak Mani-utenam), the Nunatsiavut Inuit (communities of Nain, Hopedale, Makkovik, Rigolet and Postville) and the Labrador Innu (communities of Sheshatshiu and Natuashish). For the construction of a separation plant in Sept-Îles, changes and impacts would be felt by the Innu of Uashat mak Mani-utenam.

The construction of the various components of the project could potentially impact the cultural heritage and could potentially destroy archaeological sites present in the affected areas. Similar effects on archaeological resources could also occur during the operation of the mining site (mineral resource excavation) and of the seasonal road (borrow pit mining). That will most probably be the case concerning the HbDb-b site, which is located within the B-Zone mineral deposit, where an archaeological excavation is planned for 2024-2025. Appart to that excavation, the same mitigation measures as those mentioned in Section 19.2 concerning archaeological resources could be applied in response to the impacts apprehended.

The different phases of the project could also cause a disruption of the current and projected use of the land and resources by Indigenous people. According to information obtained during the study conducted in 2012-2013, Indigenous land users are frequenting the area of the proposed mine site and its surroundings, as well as areas crossed by or located near the proposed seasonal road and along Edwards Cove / Voisey's Bay port facilities[37] .

In addition, the surroundings of the industrial port zone of Sept-Îles are likely to be used by Innu from Uashat mak Mani-utenam. It is therefore possible that the noise, dust and vibrations produced by the various works carried out as part of the preparation and construction phase, during the operation phase, and during the closure and restoration phase, could be perceived by Indigenous users, resulting in a disturbance of the peace and quietness of the site for them, as well as a potential deterioration in the practice of certain activities such as hunting. It is also possible that the noise, dust and vibrations produced during the various phases of the project could affect the resources (animals and plants) exploited and/or valued by Indigenous users, which again could adversely affect the practice of certain traditional activities, such as hunting, fishing, trapping or gathering. In this regard, it should be noted that concerns related to the effects of the project, but also to the effects of the field studies conducted as part of the ESIA process, have been raised by the various Indigenous groups concerned (in particular by the Naskapi Nation of Kawawachikamach) and taken into account by Torngat Metals and AECOM. It is also possible that Indigenous groups may reduce or even stop practising certain traditional activities because of fears of resource contamination(proven or not) linked to the project. It is also possible that access to certain areas could be restricted or interrupted as a result of the work carried out during the various phases of the project. This could have an impact on Indigenous users whose traffic routes and/or activity areas cross or are located within the affected areas. Safety issues (risk of collisions/accidents during the various phase of the project) could also be raised for these same users. In addition, Indigenous land users frequenting the surroundings of the proposed mining site, seasonal road, handling and storage facilities in Edwards Cove / Voisey's Bay port facilities and process and separation plant in Sept-Îles will be able to see these new elements, which could lead to a visual disturbance of the landscape during construction and operation phases. Once again, the same mitigation measures as those mentioned in Section 19.2

[37] As indicated in Section 15.1, a new study on land use and Indigenous knowledge will need to be carried out to update the information gathered in 2012-2013.

concerning land and resource use could be applied to limit the impacts apprehended. Additional mitigation measures may also be defined at the time of the impact assessment, in conjunction with the Indigenous communities concerned, based on their expectations and concerns regarding the proposed project.

Table 21-1 lists the potential impacts of the proposed project on Indigenous communities concerning physical and cultural heritage, as well as uses of land and ressources. This list is based on the different phases of the project.

Table 21-1: List of anticipated changes and impacts on Indigenous communities - physical and cultural heritage, use of lands and resources

Preparation and construction phases
Potential destruction or alteration of archaeological sites during construction of the various components of the proposed mine site, the seasonal access road, the handling and storage facilities at Edwards Cove / Voisey's Bay port facilities, and the rare earth separation plant in Sept-Îles.
Disruption of the current and projected use of the land and resources by Indigenous people • Disturbance of the peace and quietness of used sites / areas (noise, vibration, dusts); • Deterioration in the practice of certain activities due to the impact on used and values ressources; • Interruption of access to certain areas used for activities • Circulation interruption on traffic routes routes (i.e. Snowmobile/ATV trails, navigation routes, etc.) intersecting with or located within the affected areas • Reduction or cessation of certain activities in or near the areas affected by the project due to fears of resource contamination(proven or not) linked to the project. • Safety issues (risk of collisions/accidents)
Visual disturbance of the landscape
Operation phase
Potential destruction or alteration of archaeological sites present in on the mining site (mineral resource excavation)
Disruption of the current and projected use of the land and resources by Indigenous people • Disturbance of the peace and quietness of used sites / areas (noise, vibration, dusts); • Deterioration in the practice of certain activities due to the impact on used and values ressources; • Interruption of access to certain areas used for activities • Circulation interruption on traffic routes routes (i.e. Snowmobile/ATV trails, navigation routes, etc.) intersecting with or located within the affected areas • Reduction or cessation of certain activities in or near the areas affected by the project due to fears of resource contamination(proven or not) linked to the project. • Safety issues (risk of collisions/accidents)
Visual disturbance of the landscape
Active Closure and restoration phase
Disruption of the current and projected use of the land and resources by Indigenous people • Disturbance of the peace and quietness of used sites / areas (noise, vibration, dusts); • Deterioration in the practice of certain activities due to the impact on used and values ressources; • Interruption of access to certain areas used for activities • Circulation interruption on traffic routes (i.e. Snowmobile/ATV trails, navigation routes, etc.) intersecting with or located within the affected areas • Reduction or cessation of certain activities in or near the areas affected by the project due to fears of resource contamination(proven or not) linked to the project. • Safety issues (risk of collisions/accidents)

As mentioned and described in Section 15, appropriate studies will be conducted to assess the project's effect on the cultural and historical heritage of Indigenous communities, as well as on their land use and the resources they value. To date, the following communities have been identified for these studies :

- Nunavik Inuit : Kuujjuaq and Kangiqsulujjuaq;
- Naskapi Nation : Kawawachikamach;
- Quebec Innu : Matimekush – Lac-John and Uashat mak Mani-utenam;
- Nunatsiavut Inuit : Nain, Hopedale, Makkovik, Postville and Rigolet;
- Labrador Innu: Sheshatshiu and Natuashish;

22 Anticipated Changes and Impacts on Indigenous Communities – Health, Social or Economic Conditions

Potential impacts on Indigenous communities are not only limited to the traditional activities performed on the land but are also including impacts on socio-economic conditions, human health and quality of life among Indigenous communities. For instance, contracts could be awarded to Indigenous businesses as part of the various phases of the proposed project. Business partnerships could also be created between the proponent and Indigenous businesses, communities or groups. In addition, jobs (direct and indirect) could be created in the various Indigenous communities affected by the project, both in Quebec and in Labrador[38]. All of this could contribute to improving economic conditions in the communities concerned. However, the creation of new jobs and the influx of capital could also have negative socio-economic effects. One example is the worsening of the labour shortage that some communities are currently experiencing. Furthermore, some Indigenous workers hired as part of the proposed project will have to move away from home during their work periods (fly-in fly-out), including those who will be working at the mine site or the Edwards Cove handling and storage facility / Voisey Bay port facilities and who will be housed on site in a workers' camp. This situation could lead to changes in living conditions and habits for these workers and their families. In particular, workers will have to adapt to a new living environment and the distance from their community. Families, for their part, will have to cope with the prolonged absence of workers. A better income can also exacerbate certain problems already present among workers and their families, such as drug and/or alcohol abuse, or gambling problems.

There may also be impacts on health and quality of life, particularly in terms of access to quality food. Admittedly, by having a better income, the families of workers employed on the project could benefit from greater purchasing power, making it easier for them to buy quality food. However, for many northern communities like those involved in the present project, quality food often comes from the land and from traditional activities (hunting, fishing, trapping and gathering). It is therefore possible that by taking a job related to this project, people from Indigenous communities will have less time to devote to these traditional activities, which could lead to a reduction in the consumption of food from the land for them and their family. Furthermore, as mentioned in Section 21, it is also possible that the work carried out as part of the various phases of the project will have an impact on traditional activities, access to the land or even on the various animal and plant resources exploited by the Indigenous groups (such as movement of game due to the noise produced, change in surface water quality, potential contamination of resources). As mentioned in the previous section, it is also possible that Indigenous groups may reduce or even stop practising certain traditional activities because of concerns (proven or not) associated with the project. In any case, this could once again result in a reduction in access to traditional food and therefore in the consumption of quality food.

Furthermore, the arrival of large-scale projects such as the proposed project is generally perceived in different ways by members of a same community. Some will be in favour, while others will be vehemently opposed. It is therefore possible that this project could fuel existing tensions or even create new ones within the Indigenous communities concerned.

To limit the anticipated impacts of the project on the socio-economic conditions, quality of life and health within the concerned Indigenous communities, the preliminary mitigation measures presented in Section 19.2 could be applied. As stated in Section 21, additional mitigation measures may also be defined at the time of the impact assessment, in conjunction with the Indigenous communities concerned, based on their expectations and concerns regarding the proposed project.

[38] Torngat Metals Ltd plans to hire more than 400 workers during the operation phase, including just over 200 at the mine site, nearly 200 at the separation plant and 35 at corporate level. Since the proponent intends to promote the hiring of Indigenous workers, we can expect that a certain number of workers from communities identified in the environmental assessment will be hired.

As mentioned and described in Section 15, appropriate studies will be conducted to assess the Strange Lake project's effect on human health, quality of life and socio-economic conditions among the various Indigenous communities concerned. To date, the communities identified for these studies are the same as those listed at the end of Section 21.

As explained in Section 15.3, the first step in baseline studies is to describe the determinants of health, where possible, using a series of indicators that allow us to compare the regional or local situation with that of Quebec or Labrador as a whole. This will enable us to identify the main characteristics of the environments in which Torngat Metals's project components will be inserted.

Then, in a second phase, the impacts on human health, quality of life and socio-economic conditions will be assessed on the basis of the health determinants identified (in particular those for which concerns will be raised during the engagement activities held with the Indigenous communities concerned). Given the characteristics of the project and the environments in which its various components will be located, some preliminary determinants for which concerns could emerge could be: employment, income and employability of the population; modification of the living environment or territory; access to traditional food; alcohol consumption and risk behaviours; family environment; social cohesion; health and social services; housing; municipal infrastructures and services; demographic context.

Thereby, it is important to mention that the health and social impact assessment will be realized using GBA plus and the CRGBA (in the case of Indigenous communities), so that the health and social effects on Indigenous peoples, both positive and negative, will be assessed taking into account the various population groups. Indeed, as already said, women, girls, young people, the elderly and people with different gender identities experience development projects differently. Using a GBA Plus /GRGBA approach will ensure that negative effects for every population groups can be identified and mitigated.

In addition, it is important to note that all "human receptors" likely to be impacted by changes to the biophysical environment, social (including cultural) or economic conditions will be identified and located during the impact assessment process. The term "human receptor" refers to all inhabited or used areas likely to be impacted, such as dwellings, camps, areas used for traditional activities, recreational areas, health and social services establishments, educational establishments, etc. To this end, the project components (proposed mine site, seasonal road, handling and storage facilities in Edwards Cove / Voisey's Bay port facilities as well as the rare earth separation plant in Sept-Îles), will be precisely located. Currently available information on those project components is presented in Section 9 of this document.

Table 22-1 lists the potential impacts of the proposed project on Indigenous communities concerning health social and economic conditions. This list is based on the different phases of the project.

Table 22-1: List of anticipated changes and impacts on Indigenous communities – health, social and economic conditions

Development and construction phases
Impacts on health • Better income may result in a better access to quality food coming from the store • Reduced access to quality food coming from the land and from traditional activities • Possible contamination of valued species • Reduction or cessation of traditional activities because of concerns (proven or not) associated with the project. • Safety issues for people using the areas where the work will be carried out during development and construction phases
Impact on social and economic conditions • Job creation in local and regional communities, leading to increased income for those employed as part of the project. • Contracts for local and regional businesses • Capacity building within the communities • Increased retention of youth and working-age population due to local employment opportunities and potential business development. • Development of new training and education programs to prepare community members for employment with Torngat Metals or other organizations • Scholarship programs and funding community-led programs to increase graduation rates • Funding for community-led social, cultural and economic development programs and opportunities • Contributing to the problem of labour shortages • Social issues affecting the workers hired by the project and their families o For the workers: being away from family and friends, adaptation to a new living and working environment, exacerbation of social issues such as drug or alcohol abuse o For the family: prolonged absence of a family member, exacerbation of social issues such as drug or alcohol abuse • Tensions in local and regional communities concerning the project • Increased pressure on infrastructure in Sept-Îles and the surrounding region
Operation phase
Impacts on health • Better income may results in a better access to quality food coming from the store • Reduced access to quality food coming from the land and from traditional activities • Possible contamination of valued species • Reduction or cessation of traditional activities because of concerns (proven or not) associated with the project. • Safety issues for people using the areas where the work will be carried out during operation phase
Impact on social and economic conditions • Job creation in local and regional communities, leading to increased income for those employed as part of the project • Contracts for local and regional businesses • Capacity building within the communities • As a result of local employment and potential business development a higher retention of youth and working age population • Development of new training and education programs to prepare community members for employment with Torngat Metals or other organizations • Scholarship programs and funding community-led programs to increase graduation rates • Funding for community-led social, cultural and economic development programs and opportunities • Contributing to the problem of labour shortages • Social issues affecting the workers hired by the project and their families o For the workers: being away from family and friends, adaptation to a new living and working environment, exacerbation of social issues such as drug or alcohol abuse o For the family: prolonged absence of a family member, exacerbation of social issues such as drug or alcohol abuse • Tensions in local and regional communities concerning the project • Increased pressure on infrastructure in Sept-Îles and the surrounding region

Table 22-1: List of anticipated changes and impacts on Indigenous communities – health, social and economic conditions (Cont'd)

Closure and restoration phase
Impacts on health • Better income may results in a better access to quality food coming from the store • Reduced access to quality food coming from the land and from traditional activities • Possible contamination of valued species • Reduction or cessation of traditional activities because of fears (proven or not) linked to the project. • Safety issues for people using the areas where the work will be carried out during closure and restoration phase
Impacts on social and economic conditions • Job creation in local and regional communities, leading to increased income for those employed as part of the project. • Contracts for local and regional businesses. • Capacity building within the communities • As a result of local employment and potential business development a higher retention of youth and working age population. • Development of new training and education programs to support community members be prepared for employment by Torngat Metals or by other organizations. • Scholarship programs and funding community-led programs to increase graduation rates. • Funding for community-led social, cultural and economic development programs and opportunities. • Contributing to the problem of labour shortages. • Social issues affecting the workers hired by the project and their families o For the workers: being away from family and friends, adaptation to a new living and working environment, exacerbation of social issues such as drug or alccol abuse. o For the family: prolonged absence of a family member, exacerbation of social issues such as drug or alccol abuse. • Tensions in local and regional communities concerning the project. • Increased pressure on infrastructure in Sept-Îles and the surrounding region.

23 Greenhouse Gas Emissions and Strategic Climate Change Assessment

In order to enable consistent, predictable, efficient and transparent consideration of climate change throughout the impact assessment process, Environment and Climate Change Canada (ECCC) has developed the strategic assessment of climate change (SACC), as mentioned in Section 6. The latter is conducted under Section 95 of the Impact Assessment Act (IAA) and it applies to designated projects under the IAA. The SACC describes the greenhouse gas and climate change information that project proponents need to submit at each phase of a federal impact assessment and requires proponents of projects with a lifetime beyond 2050 to provide a credible plan that describes how the project will achieve net- zero emissions by 2050. The sections below described how these objectives will be achieved in the current project.

23.1 Greenhouse Gas Emissions (GHG)

The GHG emissions quantification allows the identification of carbon sources and their relative significance to give a better understanding of the most impactful mitigation strategies which may apply. The quantification of GHG emissions will consider the seven gases defined as GHGs under the United Nations Intergovernmental Panel on Climate Change (IPCC[39]) and by Environment and Climate Change Canada:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Hydrofluorocarbons (HFCs – a family of gases);
- Nitrogen trifluoride (NF_3);
- Perfluorocarbons (PFCs – another family of gases); and
- Sulphur hexafluoride (SF_6).

It is anticipated that GHG will mostly be emitted as CO_2, CH_4 and N_2O, but nevertheless, each gas will be quantified using an appropriate emissions factor (Table 23-1) based on the source of fuels and activities shown in Table 23-1 and Table 23-2. These gas are converted into tonne of CO_2 equivalent (tCO_2-eq) using global warming potential (GWP) which is the heat absorbed by any greenhouse gas in the atmosphere, as a multiple of the heat that would be absorbed by the same mass of carbon dioxide. The scope of emissions inventory of the project will include all direct emissions associated to combustion of fossil fuels by stationery and mobility sources and any major indirect emissions.

The initial estimation of GHG emissions associated with the project includes the operational phase of the mining site, the road, the concentration plant and the northern port facilities since there's no details available at this stage for the construction and decommissioning phases. In addition, this estimation does not include the concentrate transport from the northern port facilities to Sept-Îles Separation plant, as well as the Sept-Îles' Separation plant (construction, operation, decommissioning) as data was not available at the time of the assessment. The estimation will be updated and completed as part of the impact assessment. Section 23.8 also details the current assessment's detailed limitations.

[39] Climate Change 2022: Impacts, Adaptions and Vulnerability, Working Group II contribution to the Sixth Assessment Report.

23.1.1 Data Requirements and Gathering of Quantifiable Data

Carbon accounting begins with appropriate setting data collection templates which defines aspects of GHG quantification aligning with the physical scope of the activities taking place throughout all life cycle stages of the project. Collecting the data utilized to quantify the inputs and outputs in the GHG emissions assessment process is a critical component of the reporting and methodology development. To distinguish the data collecting process related to GHG quantification, the project will be categorized into three (3) separate phases: construction, operation and decommissioning.

The GHG quantification period will match the required service life of the infrastructure asset. It will include all activities leading to carbon emissions within the system boundary, and only exclude activities that do not significantly change the result of the quantification (i.e.: less than 1% of total GHG emissions) with justification from assumptions, inputs, and data gaps used and sensitivity analysis demonstrating validity of exclusions.

The boundaries for the construction phase include the details of activities (i.e. blasting – use of explosives) and equipment (stationary and mobile) involved in the project and land use change. GHG emissions and carbon sink removal resulting from the project's land use conversion will have a direct impact in the GHG assessment. This assessment will be conducted, according to the area of land affected in each land use category of the intergovernmental panel of climate change (IPCC)[40]. The emissions associated with the operation phase will be evaluated through the equipment involved in the operation of the facilities, transportation of the materials, waste and waste treatment, when applicable. Decommissioning emissions include activities related to the closure of the facilities including equipment, transportation, waste treatment and land use.

23.1.2 Net Greenhouse Gas Quantification Methodology

The GHG quantification assessment will be conducted using the key principles of relevancy, completeness, consistency, accuracy, transparency, and conservativeness. These principles are aligned with the CSA-ISO 14064[41] standards, the GHG Protocol[42] standards, and are defined below. It is also noted that the emission factors (Table 23-1) will be provided by National Inventory Report (NIR)[43] and additional recognized references (i.e.: Quebec standard for GHG quantification[44], US EPA).

- Relevance: The relevance of GHG sources, data and methodologies regarding the selected, defined documented and used boundaries.
- Completeness: All relevant GHG emissions will be included in the assessment with supporting information on criteria and procedures. The GHG quantification assessment will describe what sources will be included and excluded.
- Consistency: The assessment shall enable meaningful comparisons in GHG-related information. Consistent methodologies and data sources for carbon management are to be used to allow comparison over time.
- Accuracy: The assessment must reduce bias and uncertainties as far as is practical. GHG quantification will be based on available data, emission factors and estimation methodologies used, recognizing that uncertainties exist due to the early stage of the project and to emission factor availabilities for the identified activities. A conservative approach will be undertaken in the latter cases.
- Transparency: The assessment must disclose sufficient and appropriate GHG related information to allow conclusions and decisions to be made with reasonable confidence.
- Conservativeness: The assessment must use conservative assumptions, values and, and procedures to ensure that GHG emission reductions are not over-estimated.

[40] Land Use, Land-Use Change, and Forestry — IPCC
[41] ISO 14064-1:2018 Inventaires des GES et mesure de l'empreinte carbone | Product | CSA Group
[42] Homepage | GHG Protocol
[43] Canada's official greenhouse gas inventory - Canada.ca
[44] guide-quantification-ges.pdf (gouv.qc.ca)

Table 23-1: Emission Factors

Fuel Type	Source of Fuel	g CO_2/L	g CH4/L	g N_2O/L	Source
Diesel	Mobile	2,681	0.11	0.15	NIR 2020-Part 2
	Fixed	2,663	0.13	0.4	Q-2, r.15, Tableau 1.3
	Off-road Vehicles	2,681	0.07	0.02	NIR 2020-Part 2

23.2 Direct GHG Emissions

Over the operation phase, mining site shows the main sources of direct GHG emissions are related to the combustion gases generated by the circulation of trucks, machinery, and generators. It is assumed that the mine site, concentration plant, northern port facilities and all associated infrastructures are operating on diesel-fueled generators. The road's sources of GHG emissions would be exclusively related to the direct emissions linked with trucks on the road and handling of mineral materials. According to the maximum production scenario of the operation phase over 30 years (2028-2058), the annual maximum fuel consumption for the mine site, concentration plant, access road, and northern port facilities combined is estimated at 160,000,000 L/yr. The associated direct emissions would be 422,252 tCO_2 eq. per year or 12,7 Mt CO_2 eq. (Table 23-2) over the 30 years of operation.

23.3 Acquired Energy GHG Emissions

At this stage of the project, it is known that hydroelectricity will be supplied for the project's component in southern Quebec through the sole provincial, Hydro-Quebec. Hence, there is an opportunity at the Sept-Îles plant for GHG source reduction by removing the large amount of GHGs emitted typically by diesel-type generators. According to the available data, this would be only known major source of indirect emissions at this stage of the project. Note that it is expected that activities at Sept-Îles Port facilities will also consume hydroelectricity from Hydro-Quebec. This data will be integrated in the GHG assessment as the Plant's energy balance will be assessed. Studies are underway to explore the use of geothermal energy and well as purchasing renewable energy from third party suppliers.

23.4 Avoided Domestic GHG Emissions

The project is not avoiding any domestic GHG emissions.

23.5 GHG Offset Measures

GHG offset measures encompasses the sum of offset credits purchased by the project Promoter, CO_2 captured and stored, and also corporate-level initiatives. At this stage of the project, these measures are not included in the assessment. This will be further assessed as part of the impact study and adjusted as the project moves forward.

23.6 Net GHG Emissions

From the available information, the estimation of the maximum net GHG emissions for the operation phase is 12,7 Mt CO_2-eq over the entire 30 years of operation phase (2028-2058), which represent 422 ktCO_2-eq per year. Table 23-2 outlines the details on the methodology and calculations.

Table 23-2: GHG Emission Values

Emissions type	Site	Fuel Consumption (L/yr)	tCO_2/yr	tCH_4/yr	tN_2O/yr	tCO_2-eq/yr	tCO_2-eq/operational Phase (30 years)
Direct	Mine & Plant – generators	150,000,000	399,450	19.95	60.00	416,387	12,491,598
Direct	Northern Port Facilities - generators	1,000,000	2,663	0.13	0.40	2,776	83,277
Direct	Fuel and concentrate transportation (Port to Mine/Plant site)	1,134,000	3,040	0.12	0.17	3,090	92,697
Total			**402,153**	**20.21**	**60.57**	**422,252**	**12,667,573**

As requested per SACC guidelines, each term of *Equation 1* are presented in the table below

Table 23-3: SACC[45] *Equation 1* - Net GHG emissions calculation

	Description	GHG Emissions	Unit
Net GHG emissions =	Direct GHG emissions	422,252	t eq.CO2 / yr
	+ Acquired energy GHG emissions	0	t eq.CO2 / yr
	- Avoided domestic emissions	0	t eq.CO2 / yr
	- Offset measures	0	t eq.CO2 / yr
	Total	**422,252**	**t eq.CO2 / yr**

23.7 Mitigation Measures, Net-zero Plan

As per required by SACC guidelines, the federal requirements for developing and implementing a net-zero plan for 2050 will be included in the impact study. Stemming from the need to find innovative ways to reduce carbon within the infrastructure delivery process, a baseline will be established to set the goals and develop mitigation measures.

The development and implementation of mitigation measures will follow the principles outlined below:

- Emphasis on reducing the net GHG emissions of the project as early as possible during the project's lifetime;
- Based on the concept of energy efficiency, the BAT/BEP (Best Available Technologies / Best Environmental Practice) reduces energy and resource consumption at the source;
- A BAT/BEP will be performed over the project's lifetime, including any emerging technologies and practices that may become technically and/or economically feasible during the lifetime of the project;

The BAT/BEP Determination process, shown in the figure below, will involve a structured analysis developed into six steps to identify and select the most effective technologies, techniques and practices that are technically and economically feasible to minimize GHG emissions associated with the project. The scope of the BAT/BEP analysis will consider all main sources of emissions of the project, from the construction, operation, and decommissioning phases, within the scope of the project. This provides the flexibility to create project-wide scenarios that include technologies and practices minimizing GHG emissions from the main emission sources of the project.

[45] https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html



Figure 23-1 : Steps of the BAT/BEP Process [46]

At this stage in the project, the mitigation measures leading to the greatest GHG emissions reduction are listed below:

- Electric generators
- Energy-efficient and/or electric vehicles
- Energy-efficient, hybrid and/or electric machinery
- Use of biofuels
- Renewable energy production (e.g. – geothermal)
- Implementation of an energy management system (ISO 50 001)
- Renewable Energy Purchase Agreements (under Renewable Energy Certificates) – Off-site
- Carbon capture and offset

Additional mitigation measures considered include :

- Use of local materials
- Using repurposed or recycled or materials
- Low-carbon materials selection
- Minimizing building heating and cooling requirements and associated systems
- Minimizing waste
- Minimizing site transport
- Efficient construction methods (e.g., modular systems, precision manufacturing and modern methods of construction (MMC)) contributing to better built quality, reducing construction-phase waste and need for repairs in the post completion and defects period (snagging)
- Lightweight construction which uses less material
- Encourage durable construction and flexible design

[46]. Source : https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html#toc24

23.8 Limitations

It should be noted that the available data at this stage of the project is insufficient to provide a precise GHG emissions estimation for the project phase or activities below:

Direct GHG emissions:

- Construction and decommissioning phases activities
- Marine transport of concentrate from Labrador coast to Sept-Îles Plant
- Sept-Îles Separation plant's fuel consumption from machinery use (e.g. in the residue stockpile area)

Acquired energy GHG emissions:

- Sept-Îles Separation plant's electricity purchase

Upstream/downstream GHG emissions:

- Jet-fuel consumption for plane or helicopter use
- Maritime transportation of fuel to northern port facilities
- Maritime transportation of consumables to northern port facilities
- Chemical products and consumables transport (by train) between Sept-Îles Port and Plant

Therefore the current GHG emissions calculation has been developed using the data available to date and considering the maximum production rate over the entire 30 years of operational phase. The estimation will be reassessed as part of the impact study as the project moves forward.

23.9 Resilience to Climate Change

As part of the strategic climate change assessment, a climate change resilience analysis will be conducted. This will include a selection of weather-related risks that may change under current and anticipated climate change. in 2021, ECCC has published a technical guide that provides instructions and details on the level of information for the climate change resilience assessment. The climate change resilience analysis will be completed in accordance with this document and also the procedures contained in Canadian Standards Association published CSA 4011, "*Infrastructure in Permafrost: A Guideline for Climate Change*". This document provides guidance and practical advice on location and design for infrastructure in northern environments. The document describes the nature of permafrost, trends in climate change, foundation systems for community infrastructure, and presents a process for ensuring climate change is incorporated into design and location decisions. In that context, the following activities will be conducted:

- Assessment of the interactions of historical climate conditions with the project area, both in terms of trends in key climate variables (e.g., precipitation or temperature) and records of extreme events (e.g., heat waves, floods).
- Collect information and observations from the Indigenous peoples affected by the project;
- Analysis of projected future changes in the climate using climate model projections for five ranges of emission scenarios also called Shared Socioeconomic Pathways (SSPs). SSPs provide a range of plausible trends in the evolution of society over the twenty-first century (1-3 generations). The SSP families represent "sustainability" (SSP1), 'middle of the road' (SSP2), 'regional rivalry' (SSP3), 'inequality' (SSP4), and 'fossil fuel intensive' development (SSP5). SSP5 is part of the fossil fueled development pathway and is a high reference scenario that includes no climate policy. Radiative forcing reaches 8.5 W/m2 by the end of the century (three generations), resulting in a best estimate of global warming of 4.4 °C.

- Determination of climate indicators, which represents conditions or events that can cause loss of productivity, damage to the infrastructure, harm to employees or visitors, etc. The probability associated with an indicator will be calculated from observations at weather stations and climate simulations.
- Assessment of the potential climate change vulnerability. This screening determines the exposure, sensitivity, and adaptive capacity of project assets/components, the people and the environment to the selected climate indicators. Assets and operations that are exposed, sensitive and have low inherent capacity to adapt will go to the next stage of Risk Analysis. The latter will be conducted to evaluate the impacts of the climate indicators on each of the project components by evaluating their likelihood of occurrence and their potential consequences to the project, environment and people.
- Risk will be evaluated in order to rank them from unacceptable risks to acceptable levels. This risk evaluation will provide the basis for identifying when risk treatment and adaptation measures are necessary. These adaptation measures will be divided by the implementation stage:
  - Design: Measures to be incorporated during the design phase of assets for these to be resilient to future climate risks and to prevent costly revamps.
  - Operations and Maintenance (O&M): Measures to be incorporated over the lifespan of the assets during operation and maintenance to ensure resiliency.
  - Policy: Measures to be executed to always provide and maintain safe and healthy working

24 Waste, Emissions and Discharge

Section 24 provides a preliminary picture of the main potential discharges and emissions from project activities to the environment and outlines how they will be managed. This chapter complements Section 9, which also contains information on discharges, especially regarding mine and processes residue. GHG emissions were detailed in the previous section (Section 23).

24.1 Waste Management

24.1.1 Solid Waste (domestic and non-hazardous wastes)

Domestic and other non-hazardous wastes will be generated by the activities and by the workforce at the mine and concentration plant site, at the port facilities and container storage/handling facilities on Eastern Labrador Coast (options A or C for the road) and at the separation plant.

At the mine and concentration plant site, these solid wastes will be managed by following the principles of the Quebec Residual Materials Management Policy and in accordance with applicable guidelines regulations, while considering the location of the project in an isolated northern territory. Reduction at source, recycling and recovery methods will be considered before disposal. In the north, the elimination of ultimate waste residues will be carried out in a landfill meeting the specific requirements for such facility in a northern environment. As explained earlier, the landfill location shown on Maps 9-5, 9-6 and 9-7 is the one that was preferred in the prefeasibility study for the previous version of the project by Quest in 2013, but other options could be evaluated in the coming studies for the current project.

At the port facilities and container storage and handling facilities in Eastern Labrador, the solid wastes will be managed by following the Newfoundland and Labrador Provincial Solid Waste Management Strategy and applicable regulations, while considering the location of the project in an isolated northern territory. At this early stage of the project development, the type and quantity of waste produced in these facilities are not yet known but they are likely to be much smaller than at the mine site, whether road option A or C is selected. However, according to Quebec laws and regulations, it is not permitted to import residual materials from outside Quebec for the purpose of disposing of them in Quebec, which in principle would prevent them from being brought to the mine site for co-disposal with those produced there. It is not yet known where the wastes that cannot be recycled or reclaimed will be disposed of. Options will be assessed and compared as part of feasibility study and impact assessment.

At the separation plant in Sept-Îles, the solid wastes will be managed by following the principles of the Quebec Residual Materials Management Policy and in accordance with applicable guidelines regulations. Reduction at source, recycling and recovery methods will be considered before disposal. The services of local and authorized suppliers will be used for recycling, recovery and disposal.

24.1.2 Hazardous Materials and Hazardous Waste

The list of the main chemicals that could be used in the concentration process in the north and in the separation plant at Sept-Îles will be established based on the prefeasibility and feasibility studies, and will be considered in the impact assessment. The storage of all hazardous materials will be designed in accordance with applicable regulations and best practices.

Potential hazardous waste generated by the activities in the north could include waste hydrocarbons from machinery maintenance, antifreeze, various solvents, used oils and used batteries, etc. The hazardous waste will be collected at the mine site (Lac Brisson) and packaged in marine containers that meet the transportation codes for hazardous materials. The containers will be transported by road to the port facilities on the eastern coast of Labrador. The hazardous waste produced at this site, if any, will also be similarly packaged. From there, the containers will be transported by ship and then by road to an authorized treatment, recycling or disposal facility according to waste type, in compliance with applicable regulations. All transport operations will be carried out by authorized carriers in compliance with federal and provincial regulations governing the movement of hazardous waste and hazardous recyclable material.

The Sept-Îles separation plant hazardous waste will be established based on the prefeasibility and feasibility studies and will be considered in the impact assessment. All hazardous wastes will be stored in appropriate containers to be taken over by authorized suppliers and transported off-site to an approved disposal facility.

24.1.3 Residue from Mining Operation and Concentration Process

Mining operations, material concentration and material processing and separation produces significant amounts of waste, including overburden, waste rocks and mine/separation plant residue. As mentioned previously in Section 9.2, these wastes will be segregated, settled, and filtered when produced in a wet environment, and then stockpiled in specific storage areas adapted to their nature and meeting the requirements of all applicable regulations and guidelines, especially the Quebec *Directive 019*.

Residues from the concentration processes, which includes fractions from the magnetic separation and the flotation processes, will be filtered and dewatered (< 20% moisture), mixed with a cementing agent (anticipated up to 5 – 10%), transported by truck or conveyor system and deposited on the mine residue storage area stockpile (see Maps 9-5, 9-6 and 9-7). Note that, Quebec hazardous materials regulations do not apply to these residues.

As part of the feasibility study and of the impact assessment, waste rocks, material and residues from the various steps of the mining operations and concentration process that will be generated from completed or ongoing pilot tests will be sampled and characterized in accordance with the *Guide de caractérisation des résidus et du minerai* (MELCC, 2020) and the *Guide des Radionucléides Recommandés pour l'Analyse de la Radioactivité dans les Matrices Environnementales - MDDELCC, 2017*, to support the design of the various storage facitilies. The proposed geochemical characterization program is attached in Appendix D (see also Sections 9.2.1 and 14.1.4).

For guidance only, it is to be noted that around 30 rock samples were characterized in 2012 and 2013 following the *Directive 019* on the mining industry (MDDEP, 2012). This directive is still in effect but some sections were revised and new guidelines on mine residue and ore characterization (mentioned above, MDDELC*C*, 2017 and MELCC, 2020) are now in force. Samples with low, medium and high grade of rare earth elements have been analysed (Bernier 2013). For guidance only, the results show that, following the *Directive 019* criteria, those samples cannot be described as "low risk" because of the silver, arsenic and copper content. Moreover, those elements have a leachable risk level classified as "intermediate". Also, following the same criteria, the tested samples do not present a risk of acid generation. As for the radioactivity risk in those same samples, it has been classified as "intermediate". Those conclusions will potentially be revised according to the company's updated mining plan and processes, following the updates of the Directive and the new characterization guides mentioned above.

Owed to the natural radioactivity in the deposit area at the mine site, the guide (mentioned above) on the recommended radionuclide for the analysis of radioactivity in environmental matrices will be considered in all physical and biological baseline studies to be conducted, as well as in the mine and process engineering design.

24.1.4 Residue from Rare Earth Separation Plant (Sept-Îles)

As mentioned previously in Section 9.5, the rare earth separation plant produces residues. These residues will be segregated, settled and filtered, and then stockpiled in a residue storage facility located next to the plant, adapted to their nature and meeting the requirements of all applicable regulations and guidelines. Industry best practices (i.e.: dry stack, stockpile coverage) will be applied to the residues handling and storage.

The residues from the separation plant will be stored, a priori permanently, in a dry stockpile. In order to minimize the potential environmental impact, and subject to the approval of the authorities, the residues will be thickened, filtered and mixed with a cementing agent before being deposited in the residual management area. Generally, cemented backfill are inert, however, seepage and kinetic studies will be performed in order to validate the percentage of cement (currently planned to be 5-10%) to be used, the potential for long-term metal leaching and the potential source terms to be added in the water quality model. The dry residues will be covered progressively by a waterproofing system as they are accumulated, and a collection system will be installed underneath to gather the minimal seepage, if any. A study of the risks of failure will be carried out as part of the impact study to identify the risk reduction measures to be implemented during the design phase, as well as any corrective measures to be

taken during the operating phase if required. Collection ditches surrounding the residue stockpile will ensure that the minimal seepage from the residue piles will be directed to the collection basin. The collected water will be treated before being recycled to the process water system.

Geochemical and geotechnical studies will be conducted in order to inform the design of the mine residue stockpile area and the retention basin that will be used for sedimentation and/or retention for associated water treatment. The environmental design to ensure groundwater protection and wastewater treatment will be developed based on *in-situ* conditions and Quebec's *Directive 019* (MDDEP, 2012).

As previously explained in Section 10.5, a part of the natural radioactivity present in the Strange Lake deposit will remain in the concentrate processed at the Sept-iles plant and will ultimately be found in the separation plant residues. Therefore, the guide on the recommended radionuclide for the analysis of radioactivity in environmental matrices will be considered in all physical and biological baseline studies to be conducted, as well as in the process engineering design.

Furthermore, considering the concerns raised in this regard, Torngat Metals is committed to examining possible storage alternatives that would facilitate the future utilization of the stored residues. Torngat Metals will explore and evaluate the feasibility of future recovery methods that can be foreseen at the design stage, as part of the handling optimization options. These methods must meet applicable regulatory requirements and not compromise storage safety.

24.1.5 Super-bags (FIBC bags) disposal

Before final disposal of the FIBC bags, they will go through a decontamination process. The process selected will depend on the final ongoing testing results which are still ongoing. Current decontamination options include:

- Mechanical including adding surfactants, abrasion, jets etc.
- Chemical.

Final disposal will then depend on the final level of decontamination achieved, though will of course be subject to Regulation regarding the NORM levels and requirements.

24.1.6 Contaminated Soils

24.1.6.1 Northern Sites (mine and concentration plant, port facilities / container storage and handling facilities on Eastern Labrador)

Torngat Metals intends to install contaminated soil management platforms at the mine site and at the container storage and handling area/port facilities. These platforms are intended to receive and eventually treat any soil contaminated by accidental spills of petroleum products (diesel, oils, etc.) or chemicals that have occurred during handling, transshipment or accidental events. The need for such facilities stems from the remoteness of Torngat Metals' facilities from service providers in this field.

The technical and functional characteristics of these facilities will be determined as part of the feasibility study and impact assessment and will be subjected to approval by the competent authorities. The provinces of Quebec and Newfoundland and Labrador have clear regulations and guidance as to how contaminated soils must be assessed and handled. Torngat Metals will adhere to all regulatory requirements.

When it comes to remediation of contaminated soils, the most common approaches are

1. Bioremedation and

2. Relocation and disposal of contaminated soils to a regulated and licensed facility/landfill.

In the case of northern project sites, bioremediation can be a very effective method of remediating soils that are contaminated with Petroleum Hydrocarbons, although biodegradation is generally slower in northern environments. However, this process is generally very limited in addressing metals, salts, and other types of contaminants. Therefore, after remediation for hydrocarbons is completed, soils will be tested for remaining contaminant and managed according to their quality. For example, soil exceeding the criteria could be transported to an authorized treatment site, as in the case of the hazardous waste. If the quantity is too large for transport to be an environmentally sound solution, other solutions such as in situ treatment or containment could be considered, subject to prior approval by the competent authorities.

Should the soil be sufficiently remediated, soils will be kept for future reclamation.

24.1.6.2 Sept-Îles Site

Such facilities are not planned for Sept-Îles, given the more limited risk of spills due to the nature of the operations and the presence of suppliers specializing in the management of accidental spills and contaminated soils in the region.

24.2 Atmospheric Emissions Management

24.2.1 Air Emissions

The Strange Lake Rare Earth Mining Project can generate various air emissions by the different activities and project component (mine site, concentration plant, separation plant, road, port facilities) involved in the process. Emissions of contaminants will comply with both provincial (*Règlement sur l'assainissement de l'atmosphère/Clean Air Regulation* - Québec, *Air Pollution Control Regulations* - NL) and federal (*Canadian Ambient Air Quality Standards*) regulations. The potential sources of emissions, mainly generated by the construction and operation phases are:

- Excavation, drilling, blasting, loading, offloading of overburden, rock and other material: These operations can release dust and particulate matter into the air. The particles may contain substances such as particulate matter less than or equal to 2.5 µm ($PM_{2.5}$), particulate matter less than or equal to 10 µm (PM_{10}), total particulate matter (TPM). Considering the nature of the deposit, the particles may also contain crystalline silica and heavy metals, including some radionuclides in their natural state.
- Electricity generation by diesel-powered generators (northern sites): The significant energy inputs mostly come from fuel-based sources and can lead to exhaust gases, particulate matters and greenhouse gas emissions including carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (NO_2).
- Transportation (all sites): vehicles and heavy equipment travels contribute to emissions of contaminants in the air and GHG (CO_2, .CH_4, NO_2, dust - PM), This includes emissions from trucks, trains, airplanes and/or boats used to transport onsite workers, materials or equipment.
- Crushing, grinding and concentration processes (mine and concentration plant site): the crushing and grinding of the material will take place in a controlled environment equipped with dust collection equipment. Nevertheless, this process may release some dust and particulate matter (PM) in the environment. The flotation process used to concentrate the material will use chemicals that will be mostly delivered to site in a crystal or powder form. Improper handling, storage or disposal of these chemicals can lead to air emissions.
- Acid baking of the concentrate (rare earth separation plant in Sept-Îles) and calcination: the effluent gas from both the rotary kiln and fluidized bed reactor used in this process will be pre-treated by a cyclone, and further treated by lime addition in a wet-scrubber. The calcine dust collected by the cyclone and the gypsum produced by the neutralization of acid gases in the scrubber are recovered for treatment and disposal in authorized facilities. Nevertheless, this process may release some contaminants, and potentially, odors (due to the nature of the chemicals involved) in the environment.

- Material storage (mine site): low-grade, waste rock, and overburden stockpiles can release pollutants such as dust or PM carried by wind or erosion into the air. The primary method for controlling dust emitted outside will involve regular watering of mining stockpiles containing non-crushed material. During periods of freezing temperatures, alternative methods of dust suppression will be used. These may include the use of environmentally friendly dust suppressants or covering sections of stockpiles with specially designed tarpaulins to minimize dust generation. Those stockpiles will also be designed to minimise dust generation. In contrast, crushed material stockpiles will be covered by a dome and the conveyor bringing the crushed material to the concentration plant will also be covered. At the output of the concentration plant, the dewatered concentrate will be stored in FIBC bags (see Section 9.2.20.6) and containers before shipping, which will prevent emissions.
- Waste materials and residue disposal (mine site and separation plant site): mining operations, material concentration and rare earth separation processes produces significant amounts of waste, including mine residue at the mine site, as well as separation residue in Sept-Îles. Improper management of these waste materials can lead to the release of pollutants such as dust or PM carried by wind or erosion into the air.

To proactively manage and mitigate the impact of dust and contaminants, atmospheric emission modelling will predict the dispersion of dust particles and contaminants generated by the project's industrial processes and activities, including mobile sources (i.e. heavy machinery). This will be conducted for each project's components, (mine site & concentration plant, access road, port infrastructures, Sept-Îles separation plant) to facilitate the development of preventive and mitigation measures to reduce the impacts of these emissions.

For the mine, the main method of controlling dust emitted outside typical industrial processes will involve regular watering of mining stockpiles containing non-crushed material. During periods of freezing temperatures, alternative methods of dust suppression will be used. These may include the use of environmentally friendly dust suppressants or covering sections of stockpiles with specially designed tarpaulins to minimize dust generation. Additionally, these stockpiles will also be designed to minimise dust generation. In contrast, the crushed material stockpile will be covered by a dome and the conveyor bringing the crushed material to the concentration plant will also be covered.

While mining operations are expected to continue throughout the year, the bulk of activity along the access route will be concentrated during the colder months. This is due to the logistical and environmental advantages of winter in regard to the project's specific operating context. Concentrate will also be transported in sealed containers. Both aspects will minimize the likelihood of dust generation along this corridor. During summer months, the road will be used minimally for environmental monitoring or maintenance, as required. Given this reduced but continuous use, road maintenance activities will be considerably reduced throughout the project's operational phase. Haul roads dust emissions will be controlled by:

- Maximum speed limit enforcement – of 55kph; and
- Possible application of biodegradable and non-toxic dust suppression agents. Torngat Metals has no preference and will be subject to the ESIA processes and subsequent authorizations as to type and where dust suppressants will be required. If authorized, lignosulfonates might be used: these are by-products from wood processing and act by binding the road particles together. They are biodegradable and non-toxic, which makes them an environmentally friendly option.

With regards to industrial processes (concentration plant, Sept-Îles separation plant), an emphasis is placed on the use of gas and air treatment technologies (e.g. wet scrubbers, electrostatic precipitators, dust collectors) enabling the majority of contaminants and dust to be treated upstream before being released into the atmosphere. The strategies and technologies used will be regularly updated in line with industry best practice (BAT/BEP).

An air quality management plan and dust management plan will be developed as part of the project impact study for each of the project components (mine site & concentration plant, access road, port infrastructures, Sept-Îles plant). These plans will be targeting all project activities (e.g. blasting) and phases (e.g. operation and exploitation). A preliminary version of the project's air quality management plan will be included as an appendix in the impact study. These documents will be enhanced as the various engineering stages of the project progress, and on an ongoing basis during operation.

24.2.2 Noise and Vibrations

Noise could be emitted by machinery and trucks during all project phases of all project components. Some blasting may also be required during construction at specific locations (to be confirmed by future engineering studies). At the mine site, blasting, movements of machinery, crushing operations, electricity production would be the main sources of noise and vibrations during the operation phase. Aircraft movements at the aerodrome will generate noise sporadically. Trucking will also generate noise at the mine site and along the seasonal access road, up to the container storage and handling area near the port facilities. Container handling machinery and ship engines will also be a noise source in the port facilities area. At the separation plant site in Sept-Îles, the main sources of noise during operation phase would come from the transportation (generally by train) of concentrate and raw materials from the port terminal to the plant site, and from the machinery movements at the residue disposal facility.

Noise and vibrations will be assessed in detail as part of the impact assessment, including the determination of baseline conditions, the establishment of future conditions (modeling), and the selection of appropriate mitigation measures.

24.2.3 Light Emissions

In the north, the mine site and its associated facilities, the camp and the aerodrome may generate light that can cause nuisances mainly for the wildlife. In Sept-Îles, lighting will also be installed around the plant and residue storage facility, as well as the port facilities in Voisey's Bay if access road option C (C1 or C2) is selected. Light emissions will be assessed in detail as part of the impact assessment and mitigation measures will be identified.

24.2.4 Greenhouse Gas Emissions

Section 23 details specifically the GHG emissions. GHG emissions will be assessed in detail as part of the impact assessment as per the SACC guidelines & requirements.

24.3 Water Management

24.3.1 Water in the Lifecycle of a Mine

A considerable amount of water is needed for mining and processing. Different water sources can be used in a mine, in order to ensure proper water consumption at mine site. The water cycle at the mine site has some unpredictability given the influence of seasonal variations. This will be the case at the mine site for Torngat Metals. The mine water balance (WB) has been developed based on known mining processes, and to achieve best management practices (BMP) using best available technologies (BAT). A preliminary version of the general water balance is provided at Appendix D, as well as the preliminary surface water balance. The first principle for Torngat Metals is to preserve water use, and conserve the most water proportion by reusing their own waste waters, by limiting evaporation and by collecting surface runoff. The ultimate goal regarding the water lifecycle at the mine is having a water management strategy focusing on reuse of water and minimising or eliminating discharges in the receiving environment. Discharge, if any, would only occur on exceptional occasions.

Therefore, water sources will be from precipitation (rain, snow), spring snow melting runoff, as well as from groundwater, pit water and surface runoff. The mine layout and the design for water management consider the first principle that the transit of water is always separate into contact waters and non-contact waters. Non-contact water is the clean water that has not been in contact with the operation, such as water running off a hill, or water falling on area that is not part of the mine, etc. The mining, or contact water, is water coming from either the waste rock deposit areas, the open pit, low-grade piles, residue dry stacks, the roads or from the concentration plant. The water coming from the concentration plant is sometimes called processed water. Contact water is captured, retained and treated by a water treatment facility. The treated water is then re-injected into the concentration plant for its daily water need or accumulated in the water management pond in order to build up the water inventory needed to operate the concentration plant during frozen months. It is also possible that the contact water be immediately reinjected in the concentration plant if the water quality is acceptable for the process, that is, there will not be any chemical interference with the process. The water outputs in the water cycle does include natural water lost from evaporation, and from other water usages at the mine site (drinking water, sanitary needs).

As part of mining operations, mineral resource from the pit will be extracted, crushed and transported in the concentration plant via a closed conveyor. Throughout this process, an appropriate water management and monitoring will be implemented, from the extraction all the way to the processing and to transportation to the separation plant (ground, maritime).

In the current state of concentration process development, it is expected that all water will be recirculated, and the process will not generate liquid discharges, except during sporadic events. Any sporadic discharge from the process will be analyzed and treated appropriately before being released into the environment. Having a recirculating circuit will also help minimize the frequency and amount of freshwater intake.

Water quality monitoring will be an integral part of the environmental monitoring program, and will be in force during pre-construction (baseline studies), preparation work and construction, as well as during all operations, and during closure and restoration.

24.3.2 Water Discharges from the Mine and Concentration Plant Site

24.3.2.1 Mine Water and Runoff Water Within the Activity Areas (contact water)

Several ponds will be needed to receive the contact water runoff within the various mine activity areas (pit, mining areas, low-grade and other resources piles, mine residue stockpiling area, etc.). They will be located at the lowest elevation of each concerned area and will be positioned to avoid the mixing of water from different sources. The water discharged from these retention ponds may be routed, if required, to a water treatment plant (WTP) and then to a water management pond (WMP), before being reused in the concentration process. The design of the WMP will be based on the assumption that the pond is capable of managing the *Directive 019* flood event without overflowing to the environment. The design of the various infrastructures will include climate change considerations and will be based on the applicable guidelines. However, it is possible that during periods of rain, or spring melt, the combined surface runoff water and pit dewatering water will exceed the capacity of the plant to use the water, which is on average 3888 m^3/day (see preliminary water balance in Appendix D). In that case, controlled discharge will be considered, as explained later.

Extreme intense precipitation is rain that over a short period of time (5 minutes to a day) causes a large quantity of water that can overload the site's water management infrastructure. Intensity-Duration-Frequency (IDF) curves provide a link between the intensity of short-duration precipitation events and their frequency of occurrence. These curves make it possible, among other things, to study the maximum annual amount of precipitation required over various durations for different recurrence periods. It is therefore useful for managing runoff water. Due to climate change, Paquin et al (2022) suggested that the values of the IDF in Northern Quebec could increase up to 83.5% at the end of the century (Tables 24-1 and 24-2).

Table 24-1 : Recommended increases (%) to be applied to IDF curves in reference climate (2000-2019) for estimating IDF curves for various future periods according to SSP5- 8.5 scenario

Average increase (%)							
Horizon	Duration (hours)						
	1	2	6	12	24	48	72
2020-2040	15.0	14.0	12.0	10.0	8.5	8.0	7.5
2040-2060	33.5	32.0	27.0	22.5	19.5	17.5	16.5
2060-2080	57.0	54.5	45.5	38.5	33.0	30.0	28.0
2080-2100	83.5	80.5	67.0	56.5	48.5	44.0	41.0

The Table 24-2 presents the IDF values at the airport of Schefferville for the horizon 2071-2100 according to SSP5-8.5 scenario (RCP 8.5 equivalent). With the release of the IPCC's Sixth Assessment Report (AR6) in 2021 and 2022, the IPCC replaced the RCPs with five Shared Socioeconomic Pathways (SSPs), which provide a range of plausible trends in the evolution of society over the twenty-first century (1-3 generations). Each SSP family consists of two elements: a set of qualitative, narrative storylines describing societal futures; and a set of quantitative measures of development at aggregated and/or spatially resolved scales. The SSP families represent 'sustainability' (SSP1), 'middle of the road' (SSP2), 'regional rivalry' (SSP3), 'inequality' (SSP4), and 'fossil fuel intensive' development (SSP5). SSP5 is part of the fossil fueled development pathway and is a high reference scenario that includes no climate policy. Radiative forcing reaches 8.5 W/m^2 by the end of the century (three generations), resulting in a best estimate of global warming of 4.4 °C. The high emission levels within this scenario are only obtainable under the fossil fueled SSP5 pathway and not under any of the other SSPs. This scenario is similar to RCP8.5, but emissions are higher near the end of the century than under RCP8.5. SSP5-8.5 might also result in slightly higher temperatures when used with the same model settings. Beyond 2100 (three generations), global CO_2 concentrations in the atmosphere are predicted to continue to rise until stabilizing sometime after 2200 (seven generations), resulting in the radiative forcing also continuing to rise before peaking at approximately 12 W/m^2 around 2250 (nine generations) and then declining slightly (Meinshausen et al., 2020).

Table 24-2 : Projected short duration rainfall intensity-duration-frequency for SSP5-8.5 for the horizon 2071-2100

Duration of the event	Average increase in mm					
	Return period					
	2 years	5 years	10 years	25 years	50 years	100 years
5 min	73.0	113.0	139.0	172.0	197.0	221.0
10 min	52.0	74.0	90.0	109.0	123.0	137.0
15 min	40.0	57.0	68.0	82.0	93.0	103.0
30 min	25.0	35.0	41.0	50.0	56.0	62.0
1 hour	17.0	24.0	28.0	33.0	37.0	41.0
2 hours	11.0	16.0	18.0	22.0	24.0	27.0
6 hours	6.1	7.9	8.9	10.0	11.0	12.0
12 hours	4.0	5.2	6.0	6.9	7.6	8.2
24 hours	2.6	3.4	4.0	4.7	5.2	5.8

Source : IDF Data and Climate Change — ClimateData.ca

24.3.2.2 Wastewater from Concentration Processes (process wastewater)

At the current stage of process development for the concentration plant, it is expected that all process water will be recirculated, and the process will not generate a liquid discharge, except during sporadic events or plant upsets. A water management pond will be constructed to receive this water during the upsets in order to avoid a discharge. Where possible contact water collected on-site, as well as pit water, will be used to replenish any losses (to be confirmed during the pre-feasibility and feasibility studies).

24.3.2.3 Washing Water

Washing and maintenance water in the buildings will be managed separately from mine and process water and sent to a water treatment unit before being sent to a WMP for reuse. An oil-water separator (oil skimmer) will be installed at the collection point of the wash down water (when required).

24.3.2.4 Water Treatment Plant (WTP)

The water treatment technology (or technologies) is being selected using a best achievable technology (BAT) process that includes 5 steps. These are: 1) Identification of information to be gathered for the BAT assessment, 2) Identify all potential technologies, 3) Screening for feasible options, 4) Multiple accounts analysis to describe and

compare the site specific: reliability, control effectiveness, and cost effectiveness of each option, and 5) Selecting the BAT. The engineering criteria will be based on governing conditions for climate, for example, using rate constants and sizing basis that incorporates worst-case seasonality. Best environmental practices (BEP) are also followed for water management and treatment.

24.3.2.5 Domestic Wastewater (sewage)

An on-site sewage treatment plant will be constructed to effectively treat sanitary water from offices, washrooms and other facilities. Though still under development, treatments could include biological treatments, sedimentation and disinfection of the effluents. Septic systems could also be integrated into the treatment process, taking advantage of natural processes to mitigate the impacts of domestic effluents. These options will be assessed as part of the feasibility study and ESIA.

24.3.2.6 Discharge Points

Two major regimes will be experienced at the mine site: winter and summer. The water management strategy will take into consideration the types of treatment possible, discharge seasonality, climate, and receiving water quality. As explained above, efforts are being made to use and discharge a minimal amount of water, with a focus on reuse of contact water in the mining and concentration processes. Water will be held in water management ponds during the winter in order to supply the plant with its daily water need. Discharge, if any, would only occur in ice free months.

In order to respond to exceptional situations that would require water to be discharged despite all the measures taken to reuse all the water, three potential discharge options for the treated contact water and the treated process wastewater have been considered:

- The first and preferred option, is to pump the water to the top of a hill and let it run down an intermittent creek with engineered wetland sections. The return of treated water to the Lake Brisson would then be made more progressively, and wetland features could be designed to further treat the water. This creek is known to have no fish downstream of the access road (2012 station EF-15, 2023 station 3F). Further fish investigation will be completed in 2024 to comprehensively assess this creek from headwaters to its outlet in Lake Brisson. If no fish are captured during sampling in 2024, testing will be undertaken to ensure that this scenario would be acceptable to environmental authorities and the public. This option will be evaluated in the ESIA.
- The second option is to discharge directly to the Lake Brisson in the most proximal bay. Although of less technical complexity, this option would not warrant enough dilution before the water reaches the lake. Data from bathymetry surveys conducted in 2023 indicates that there is no significant flow in Lake Brisson given the presence of shallow bays and islands. It would be very difficult to achieve proper mixing of water with the standard technologies. For this reason, this second option is not retained.
- The third option is to discharge in Lake Brisson, but rather using a diffuser. Given no significant flow detected in 2023 related to the presence of shallow bays and islands, that option includes long piping to get further away than the proximal bays surroundings the installations, and design of a diffuser to counterbalance the existing limiting conditions at site. This option will be evaluated in the ESIA.

A second discharge is anticipated for the sanitary circuit (domestic wastewater). Diffusers could also be used for the sanitary discharge, and they would be designed to ensure maximal dilution of any releases into the lake. To further minimize water use, greywater recycling systems are also being considered which would use water from sinks, showers and laundry as a water supply for non-potable purposes (toilet flushing, irrigation). Alternatively, Torngat Metals is in the process of evaluating the possibility of having the solid waste transported to an outside facility for treatment, and therefore only water would remain to be treated. Other option under consideration would be to integrate artificial wetlands in the domestic water treatment process and the use of greywater as a supply for dust suppression on-site.

Overall, at the mine site, the potential discharge points are located on Maps 9-5, 9-6 and 9-7 of the DPD (options A, B and C of the mine layout). Two discharge points are for mining and process water, one corresponding to the engineered wetland, the other to the diffuser in Lac Brisson, as described above. The other discharge point is for the treated domestic wastewater. Discharge locations are established based on hydrologic modelling and in order to reduce environmental impacts. The monitoring that will be conducted at the mine site discharge point(s) will be established based on standard regulations (mining discharge under MDMER, EEM Program from ECCC, along with the requirements of Quebec *Directive 019* and the establishment by the MELCCFP of Effluent Discharge Objective [OER]) to be respected. Biological monitoring (fish tissues, benthic invertebrates) will be added to water/sediment sampling programs which are required by the MDMER of ECCC (EEM Program). The monitoring requirements under the MDMER include weekly, monthly and quarterly monitoring of the effluent, quarterly toxicity testing of the effluent and quarterly monitoring of the receiving environment. MDMER monitoring requirements also include sampling of the fish and benthic invertebrate populations every three years quantifying effects on benthic community structure and morphological changes in fish.

24.3.3 Water Cycle at the Separation Plant

As for the mining site, the ultimate goal regarding the water lifecycle at the Sept-Îles separation plant is having a water management strategy focusing on reuse of water and eliminate discharges into the surrounding environment. Discharge, if any, would only occur under exceptional circumstances.

The wastewater from the Sept-Iles separation plant is mostly coming from the three separation steps of the water leaching process (two from thickening and one from a filtration and ion exchange step). Some wastewater is also generated in the light rare earth extraction step, but very little in the heavy rare earth separation step (see Section 10-3). The wastewater is treated and reused in the process.

24.3.4 Water Discharges from the Separation Plant and its Process Residue Stockpile Area

As previously detailed in Sections 9.5.2 and 9.5.3, any effluent originating from upsets to the separation process will be directed to a pond, treated and returned into the process. Moreover, no effluent discharges from the residue stockpile area are expected during normal operations. Any effluent originating from contact water from the residues due to extreme weather events will be directed to a pond, treated and returned into the process plant.

The management strategy for the separation process wastewater (industrial wastewater) and water that has been in contact with process residues will be similar to that for concentration process water and contact water at the mine site (see Sections 24.3.2.1 and 24.3.2.2 above). Water management pond will be used for storing treated water and supply the plant with its daily water need. As for the mine site, the water treatment technology (or technologies) is being selected using a best achievable technology (BAT) process that includes 5 steps (see Section 24.3.2.4 above).

However, a discharge point for treated water into the Rivière au Foin might be required. To date, all modeling indicate that this will not occur, but as a safety measure an emergency discharge location may be needed during extreme weather event. Should such an event occur the dilution from the precipitation will be such that the impacts of a small amount of discharge will be minimum. This event will be modeled and studied. The characteristics and exact location of the discharge point for any surplus water from the separation plant and its process residue stockpile area are not yet known. Options will be evaluated and compared as part of the prefeasibility and feasibility studies and in the context of the impact assessment.

The domestic wastewater (sewage) will be discharged to the municipal sanitary sewer in compliance with applicable standards and regulations, in particular the municipal by-laws of the city of Sept-Îles.

25 Cumulative Effects

Cumulative effects are defined as changes affecting the environment caused by an action combined with the effect of past, present or future activities. Cumulative effects therefore result from the combined effect of the present project and those stemming from other activities (past, actual or future) taking place on the same geographical location, or territory (study area).

These cumulative effects can occur over a certain time and at a certain distance from the project. The current section evaluates how the exploitation of the Strange Lake Rare Earth Mining Project activities, can exert cumulative impacts on Valued Ecosystem Components (VECs) in the territory (study area). The assessment of the cumulative effects therefore involves:

1. Identifying the VECs to be considered in the analysis of the cumulative effects
2. Identifying and justifying the spatial and temporal limits of the analysis, based on the intrinsic characteristics of the VECs and their distribution
3. Identifying past, present or future activities in the territory considered that may affect these same VECs
4. Determining whether the effects of the Stange Lake Project on a VEC accrue with the effects of other project activities
5. Determining whether the combined effects of the Strange Lake Project and other activities risk causing current or future change to the VECs and whether additional mitigation measures should be deployed

Cumulative impacts will therefore be presented after the residual impact assessment, taking into account mitigation measures, so that the reader can clearly distinguish them from the direct or indirect impacts of the main project.

25.1 Identification of the VECs Considered

The VECs considered for the assessment of the cumulative impacts arise from the six environmental and social issues identified in Section 19.1 of this report. The most relevant criteria for the selection of potential VECs are as follows:

1. the recognition of the importance of a component through legislation, regulation or policy ;
2. the sensitivity or vulnerability of the component ;
3. the uniqueness or rarity of the component ;
4. the sustainability (durability) of the component or ecosystem ;
5. the value or importance assigned to the resource by stakeholders;
6. the risks to health, safety or well-being of the public;
7. the ecosystem characteristics, both of the northern environment (beyond the forest line and in the presence of discontinuous permafrost) and of the Sept-Îles environment.

In the case of biodiversity, the species or groups of species considered as VECs for the analysis of cumulative effects in the present study are those with an increased risk of being disturbed by the mining activities and collisions with road vehicles (ex. caribou) and those valued by Indigenous and non-Indigenous groups concerned by the project (ex. caribou, Arctic char, water quality). These VECs will be revised during the elaboration of the project. They will be bonified if necessary.

25.2 Identification and Justification of the Spatial and Temporal Limits of the Analysis

For the northern activities (mine site, seasonal access road, containers storage at the port facilities), the spatial boundaries considered for this analysis extend beyond those of the proposed mine site and the identified corridors for the proposed seasonal road. The limits of the bio-physical environment will include projects likely to have had or will have an impact on valued VECs such as the George River caribou herd, as well as George River and Ikalivik Brook water quality. Concerning social environment, the spatial limits for the purposes of the analysis will be extended to include other projects that have had or will have an impact on access to land and resources, archaeological resources, socio-economic conditions, health as well as psychosocial condition of the Indigenous and non-Indigenous communities affected by the project.

For the separation plant in Sept-Îles, the spatial boundaries considered for this analysis also extend beyond those of the proposed plant and residue storage facility site. The limits of the bio-physical environment will include projects likely to have had or will have an impact on valued VECs such as the Au Foin River and the Baie des Sept-Îles and their biological components. The spatial limits of the social environment for the purposes of the analysis will be extended to include other projects that have had or will have an impact on valued VECs such as socio-economic conditions, health, psychosocial condition of the Indigenous and non-Indigenous communities affected by the project, as well as landscape.

It is difficult to establish time limits at this stage. As a preliminary step, we propose to consider a period of 15 years for past activities. If necessary, this limit will be reviewed during the analysis. Concerning future activities, the anticipated operation phase of the Strange Lake project extends to 30 years from construction, and includes the closure and restoration phase up to 2072. For the purposes of this analysis, the lifecycle of the projected mine will include the timelines from construction (starting in 2027) until restoration (2072). The temporal limit on the territory that will be considered for future activities is then approximately 45 years.

25.3 Effects of the Project on VECs Accrue with the Effects of Other Activities

Concerning biophysical components cumulative effects could be:

- atmospheric pollution due to the emission of dust particles of the project and other projects;
- maritime and port activities in Anaktalak Bay and Voisey's Bay in addition to that already generated by other projects;
- caribou habitat fragmentation in addition to that already generated by other projects;
- additional light sources that might interfere with bird migration.

Concerning cultural heritage and the use of land and resources by Indigenous and non-Indigenous groups cumulative effects could be:

- increased pressure on archaeological resources in addition to that already generated by other projects;
- opening up of the territory due to the accumulation of road development;
- additional disturbance of land use activities performed by Indigenous and non-Indigenous groups (noise, dusts, vibration, restriction or interruption of access to certain areas or traffic routes);
- additional impacts on resources valued by Indigenous and non-Indigenous groups (such as the caribou, and Arctic charr);
- additional visual disturbance of the landscape.

Concerning quality of life, socioeconomic conditions and health conditions among local and regional communities (Indigenous and non-Indigenous), cumulative effects could be:

- accentuation of the effect on labour shortages due to the demand for employees for different large-scale projects in the same region;
- increased pressure on businesses and infrastructure (particularly accommodation infrastructure) if major projects are carried out at the same time in the same region.
- possible exacerbation of other socio-economic impacts associated with the implementation of other projects;
- possible exacerbation of tensions within communities regarding development;
- additional sources of potential contamination of consumed resources (animal and plant);
- increased reduction in access to traditional food.

25.4 Identification of Past, Present and Future Activities Potentially Affecting VECs

The analysis will identify other activities or development projects (past, present or future) that may have an impact on VECs of biophysical environment, like air quality (ex: atmospheric pollution coming from industries south of the site), caribou and other terrestrial wildlife, Arctic char, waterfowl (ex: fragmentation of the territory, creation of dams). It will also consider past, present and future activities that have had, are having or are likely to have an effect on the VECs of the social environment, such as land use activities performed by the Indigenous and non-Indigenous communities (ex: opening up of the territory due to road development by other mining companies), as well socio-economic and health conditions of Indigenous and non-Indigenous communities (such as the accentuation of the effect on labour shortages or other socio-economic impacts associated with the implementation of other projects).

Known projects (already completed, in progress or planned) likely to have an impact on the valued components of the environment include the following:

In the northern areas: Strange Lake mine site, road corridor, container storage and handling facilities:

- Mining activities in Voisey's Bay Area by Vale Inco and related maritime and port activities in Anaktalak Bay and Edwards Cove;
- Wind Micro-Grid Project in Nain. The project construction was scheduled for July 2022 and the commencement of commercial operation is scheduled for October 2023.
- Activities related to the New Nain Airport Project, for which baselines are ongoing (2022-2024), and construction is planned for 2027-2030;
- The projected construction of a Road leading to Northern Labrador. The Government of Newfoundland and Labrador, Department of Transportation and Infrastructure, published a request for proposals under a Prefeasibility Study in October 2022, for a potential extension of the Trans-Labrador Highway into Nunatsiavut.
- Mining activities around Schefferville by Labrador Iron Mines Ltd and Tata Steel Minerals Canada.

In addition to these, other projects will be considered in the cumulative effects in the north given their proximity to the northern components of the project, as requested in the Summary of Issues (SI 12.3 ; Appendix A):

- Crater Lake Mining Project, Scandium Canada Ltd.
- Joyces Lake Mining Project, Joyce Direct Iron Inc.
- Ashram Mining Project, Commerce Resources Corp.

In the Sept-Îles area: rare earth processing and separation plant

- Alouette aluminum smelter refurbishment project;
- Any project (modernization, renovation) on the Port of Sept-Îles infrastructures;
- Possible Arnaud Mine Project (phosphate and apatite);
- Mining activities around Schefferville by Labrador Iron Mines Ltd and Tata Steel Minerals Canada;
- Construction of housing units and infrastructures at Uashat and Mani-Utenam.

Again, in addition to these, other projects will be considered in the cumulative effects, as requested in the Summary of Issues (SI 12.3 ; Appendix A):

- Kwyjibo Mining Project, SOQUEM
- Iron Ore Company (IOC), Rio Tinto
- Minerai de fer Québec, Filiale Champion Iron
- Joyces Lake Mining Project, Joyce Direct Iron Inc.

For both (north and south), for abandoned mines not yet rehabilated, they will be considered accordingly during the EIS based on their locations, and timelines.

PART G – SUMMARY (Separate Doc)

References

Adelson, N. 2005. « The embodiment of inequity: health disparities in Aboriginal Canada ». Canadian Journal of Public Health, vol. 96, no S2, p. S45-S61.

Administration portuaire de Sept-Îles. 2022. Pratiques et procédures /Practices & Procedures. 34p. [Online]: https://www.portsi.com/wp-content/uploads/2022/06/2017-09-05-Mesures-de-precautions-environnementales-SANS-SIGNATURE.pdf.

Administration portuaire de Sept-Îles. 2017. Mesures de précaution environnementales / Environmental Precautionary Measures. 25 p. [Online]: https://www.portsi.com/wp-content/uploads/2022/06/2017-09-05 Mesures-de-precautions- environnementales-SANS-SIGNATURE.pdf.

AECOM. 2024. *État de la situation volet archéologique. Option C de la route d'accès et site portuaire projeté.* 19 p.

AECOM. 2015. Strange Lake-B Zone: Biological Environment Baseline Surveys. Semi-aquatic and Terrestrial Wildlife – 2011-2013 – Final Report. 145 p. +appendices

AECOM. 2014. Quest - Strange Lake B-Zone Social Environment Baseline Studies – Labrador and Nunatsiavut Stage 2 - Detailed Impact Assessment – Road Corridor and Port Site. 93 p. + appendices.

AECOM. 2013a. Pre-feasibility study Strange Lake B-Zone. Volume-1 Text. 2013. 750p.

AECOM. 2013b. Strange Lake-B Zone: Physical Environment Baseline Surveys. Preliminary Report – Soil and Groundwater Assessment, 2011 and 2012. Landscape – Road Corridor and Port Site. 63 p. +appendices

AECOM. 2013c. Strange Lake B-Zone: Biological Environment Baseline Surveys. Aquatic ecology, surface water and sediment quality, 2011.2012. SLBZ-RE-0000-EN-008. 203 p. + appendices.

AECOM. 2013d. Strange Lake B-Zone Biological Environment Baseline Surveys. Vegetation – 2011-2012. Quest Rare Minerals Ltd. Final Report. November 2013. 128 p. + Appendix.

AECOM. 2013e. Strange Lake-B Zone: Social Environment Baseline Studies. Land Use and Traditional Knowledge – Mine Site, Road Corridor and Port Site. 69 p.+ appendices.

AECOM. 2013f. Strange Lake-B Zone: Social Environment Baseline Studies. Socio-Economic Profile – Northern Communities. 160 p.

AECOM. 2013h. Strange Lake-B Zone: Government and Community Relations – Workforce and Recruitment Analysis – Mine Site, Road Corridor and Port Site.

AECOM. 2013g. Strange Lake-B Zone: Social Environment Baseline Studies. Local Services Analysis – Mine Site, Road Corridor and Port Site. 56 p.

AECOM. 2013i. Strange Lake-B Zone: Archaeological Inventory - Mine Site. 57 p. + appendices.

AECOM. 2013j. Strange Lake-B Zone: Social Environment Baseline Studies. Landscape – Mine Site. 21 p.+ appendices.

AECOM. 2013k. Strange Lake-B Zone: Social Environment Baseline Studies. Landscape – Road Corridor and Port Site. 25 p. +appendices

AECOM. 2012a. Strange Lake B-Zone: Physical Environment Baseline Surveys - Ambient Noise, 2011, A08-04_Env_Baseline_Noise_FINAL Report_CA-2012-12-21, 59 p.

AECOM. 2012b. Strange Lake – Surface Water Quantity (Hydrology), 23 p + appendices.

AECOM. 2011. Strange Lake B-Zone – Physical Environmental Baseline Surveys, Ambiant Air Quality, 38p. + appendices

Agence de la santé publique du Canada. 2015. La tuberculose au Canada 2013, [En ligne] : http://www.phac-aspc.gc.ca/tbpc-latb/pubs/tbcan13pre/assets/pdf/tbcan13pre-fra.pdf (Page consulted in May 2023). Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The Return of Caribou to Ungava. McGill/Queen's University Press. 586 p.

Allard, M., Chiasson, A., B. St-Amour, A., Mathon-Dufour, V., Aubé-Michaud, S., L'Hérault, E., Bilodeau, S. et Deslauriers, C. (2020). Caractérisation géotechnique et cartographie améliorée du pergélisol dans les communautés nordiques du Nunavik. Sommaire exécutif et recommendations. Québec, Centre d'études nordiques, Université Laval. https://bit.ly/CEN_MAMH_Caracterisation_pergelisol_Nunavik

Allard, M., Lemay, M., Barette, C., L'Hérault, E., Sarrazin, D., Bell, T., Doré, G. (2018). Permafrost and climate change in Nunavik and Nunatsiavut: importance for municipal and transportation infrastructure. In *Nunavik and Nunatsiavut: From Science to Policy. An Integrated Regional Impact Study (IRIS) of Climate Change and Modernization*, eds. Michel Allard, Mickaël Lemay. Quebec City, QC: ArcticNet Inc

Argus and Pryer, 1990. Rare vascular plants in Canada: our natural heritage. Canadian Museum of Nature. ISBN: 066013053X

Atlantic Canada Conservation Data Centre. [Online]: http://www.accdc.com/

Beaumier, M., 1982. Géochimie des Sédiments de Lac dans la Région de la Rivière George,Territoire du Nouveau Québec. Ministère de l'Énergie et des Ressources, DP82-16.

Bergerud, A. T., S. N. Luttich, and L. Camps. 2008. The Return of Caribou to Ungava. McGill Queen's University Press, Montreal, Quebec.

Bernier, L.R., 2013. Highlights on 2013 Environmental Geochemical Testing Program for Water Quality Seeping from Mine Rock Piles, Lake Strange: Internal report prepared for AECOM by Terrapex Environment. Draft Report. 21 st Sept. 2013. 45 p.

Bernier, R.Y., Jamieson, R.E. et Moore, A.M. (eds.) 2018. State of the Atlantic Ocean Synthesis Report. Rapport tech. can. Sci. halieut. aquat. 3167 : iii + 149 p.Press, Montreal, Quebec.

Bird, L. (2021, January 18th). Labrador's Arctic char vulnerable to climate change, says new study. CBC News Newfoundland [Online]: https://www.cbc.ca/news/canada/newfoundland-labrador/arctic-char-labrador-climate-change-study-1.5871390

Bourque, M. et J. Malouin, 2009. Guide d'intervention en matière de conservation et de mise en valeur des habitats littoraux de la MRC de Sept-Rivières. Comité ZIP Côte-Nord du Golfe, ix + 155 p.

British Columbia Ministry of Health. 2002. « The health and well-being of Aboriginal people in British Columbia », Provincial Health Officer's Annual Report 2001, Victoria, British Columbia Ministry of Health.

Brouillet, L., P. Desmet, F. Coursol, SJ. Meades, M. Favreau, M. Anions, P. Bélisle, C. Gendreau, D. Shorthouse, et contributeurs. 2010+. Base de données des plantes vasculaires du Canada (VASCAN). [Online] : http://data.canadensys.net/vascan

Bureau du Coroner du Québec. 2017. Rapport d'enquête : concernant les décès de M. Charles Junior Grégoire-Vollant, Mme Marie-Marthe Grégoire, Mme Alicia Grace Sandy, Mme Céline Michel-Rock, Mme Nadeige Guanish. 38 p. et annexes.

Burström, B. et P. Fredlund. 2001. « Self rated health: Is it as good a predictor of subsequent mortality among adults in lower as well as in higher social classes? », Journal of Epidemiology and Community Health, vol. 55, no 11, p. 836 à 840.

Calderon. I. 1996. Caractérisation de la végétation et de la faune ichthyenne de la baie de Sept-Îles. Document réalisé par la Corporation de protection de l'environnement de Sept-Îles, avec l'aide du ministère des Pêches et des Océans dans le cadre du programme « Biodiversité », Mise en valeur des habitats du poisson, Saint-Laurent Vision 2000, 47 p. [Online] : https://cpesi.ca/wp-content/uploads/2021/02/caracterisation_-vegetation-et-faune-ichtyenne-de-la-baie-de-si_1996.pdf

Canadian Council of Ministers of the Environment (CCME). 2023. Canadian Environmental Quality Guidelines. [Online] : https://ccme.ca/en/current-activities/canadian-environmental-quality-guidelines

Canadian Council of Ministers of the Environment (CCME). Air Quality Report. [Online]. https://ccme.ca/en/air-quality-report

Canadian Environmental Assessment Act (2012) enacted by section 52 of chapter 19 of the Statutes of Canada, 2012, effective July 6, 2012, see SI/ 2012-56].

Canadian Diabetes Association. 2013. « Clinical Practice guidelines for the prevention and Management of diabetes in Canada ». Canadian Journal of Diabetes, vol. 37 (supplement 1), p. S1-S212.

Canadian Standards Association (2006) CAN/CSA-ISO 14064-1-06, Greenhouse Gases – Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals; CAN/CSA-ISO 14064-2-06, Greenhouse Gases – Part 2: Specification with Guidance at the Project Level for Quantification, Monitoring and Reporting of Greenhouse Gas Emission Reductions or Removal Enhancements; and CAN/CSA-ISO 14064-3-06, Greenhouse Gases – Part 3: Specification with Guidance for the Validation and Verification of Greenhouse Gas Assertions

Canadian Standards Association (CSA) Group. 2018. ISO 14064-1:2018 Inventaire des GES et mesure de l'empreinte carbone. [Online] : https://www.csagroup.org/store/product/50074088os/

Canadian Standards Association (CSA) Group. 2019. CSA 4011:2019. Technical Guide : Infrastructure in permafrost : A guideline for climate change adaptation. 96 p. [Online]: https://www.csagroup.org/store/product/CSA%20PLUS%204011:19/

Canadian Science Publishing. 2021. Environmental reviews Volume 29 - The potential environmental risks associated with the development of rare earth production in Canada.

Canards Illimités Canada (CIC) (2009). Plan de conservation des milieux humides et de leurs terres hautes adjacentes de la région administrative de la Côte-Nord. 89 p. Disponible au : http://www.ducks.ca/assets/2016/12/PRCMH_R09_CTND_2009_portrait_texte.pdf

Camirand J., Sermet C., V. Dumitru V., et S. Guillaume. 2009., « La perception de la santé dans la population de 55 ans et plus et les caractéristiques de santé modulant cette perception en France et au Québec », Zoom santé, Institut de la statistique du Québec, no 18, 12 p.

Carrière, J. ed. 2018. Observatoire environnemental de la Baie de Sept Îles. Volume1. Sept-Îles, Québec: Institut Nordique de Recherche en Environnement et en Santé au Travail. INREST. [En ligne] : https://inrest.ca/wp-content/uploads/2021/04/Livre-COMPLET-INREST.pdf

Celeste McKay Consulting Inc. and McRae D. 2021. Follow up Report to the Canadian Human Rights Commission on the Human Rights of the Innu of Labrador. 81 p.

Centre de données sur le patrimoine naturel du Québec (CDPNQ). 2023. Carte des occurrences d'espèces en situation précaire. [Online] : https://services-mddelcc.maps.arcgis.com/apps/webappviewer/index.html?id=2d32025cac174712a8261b7d94a45ac2

Centre d'Expertise en Analyse Environnementale du Québec, 2015. Procédure d'évaluation du risque radiotoxique pour l'environnement, Québec, Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques, 28 p. et annexes.

Centre intégré de santé et de services sociaux de la Côte-Nord (CISSCN). 2018. Portrait de santé des résidents de Caniapiscau. 37 p.

Chamois, P. and Cook, B., (2007), Technical Report on the George Rive Project, Northeastern Québec and Northwestern Newfoundland and Labrador, Canada. Prepared for Freewest Resources Canada Inc., NI 43-101 Report. Scott Wilson Roscoe Postle Associates Inc. 132 p, August, 2007.

Charette, B., Lafrance, I., Godet, A. and Vanier, M.-A., 2019. Mistinibi-Raude Domain, southeastern Churchill Province, Nunavik, Quebec, Canada: geology synthesis. Ministère de l'Énergie et des Ressources Naturelles. Online: https://gq.mines.gouv.qc.ca/bulletins-geologiques/churchill/mistinibi-raude/

Climate Change 2022: Impacts, Adaptions and Vulnerability, Working Group II contribution to the Sixth Assessment Report. [Online]: https://www.ipcc.ch/report/ar6/wg2/

Climatedata, IDF Data and Climate Change, 2024. [Online]: https://climatedata.ca/resource/idf-data-and-climate-change/

Comité ZIP Côte-Nord Du Golfe. 2023. Fiche#8 Baie des Sept-Îles.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 2012. Assessment and status report on the American Eel Anguilla rostrata in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 109 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

CCME (Conseil canadien des ministres de l'environnement). 2020. Document d'orientation sur l'évaluation du risque éco-toxicologique. 210 p.

CRECN (Conseil régional de l'environnement de la Côte-Nord). 2016. Portrait des milieux naturels – Fiches synthèses. Conseil régional de l'environnement de la Côte-Nord (CRECN), Sept-Îles, Québec, 53p.[Online]: http://milieuxnaturels.septiles.ca/PMN_SI_fiches_FINAL.pdf

DeSalvo, K. B., N. Bloser, K. Reynolds, J. He et P. Muntner. 2005. « Mortality prediction with a single general self-rated health question: A meta-analysis », Journal of General Internal Medicine, vol. 21, no 3, p. 267 à 275.

De Robertis, A. and N.O. Handegard. 2013. Fish avoidance of research vessels and the efficacy of noise-reduced vessels: a review, ICES Journal of Marine Science, Volume 70, Issue 1, January 2013, Pages 34–45, https://doi.org/10.1093/icesjms/fss155

Destination Labrador. 2023. About Labrador. History and Cultures. [Online] : http://www.destinationlabrador.com/guide/history_and_cultures.htm (Page consulted in May 2023).

Dewailly, E, C Blanchet, S Gingras, S Lemieux, Sauve L, et al. 2001. "Relations between n-3 fatty acid status and cardiovascular disease risk factors among Quebecers." American Journal of Clinical Nutrition, 2001: 603–611.

Dewailly, Eric, Marie-Ludivine Chateau-Degat, Jean-Marie Ékoé, and Robert Ladouceur. 2007. Qanuippitaa-How are we? Status of cardiovascular disease and diabetes in Nunavik. Nunavik Regional Board of Health and Social Services and Institut national de santé publique du Québec.

Direction de santé publique de la Côte-Nord. 2010. Enquête Santé Côte-Nord 2010.

Dredge, L. 1983. Surficial geology, Sept-Îles, Quebec. Commission géologique du Canada, Carte série "A", 1575A. https://doi.org/10.4095/109268.

Dredge, L. 1971. Late-Quaternary sedimentary environments, Sept-Îles, Québec. Université de Waterloo, Ontario, Master thesis. 102 pages.

Dubé-Loubert, H., Daubois, V., Roy, M., 2016. Géologie des dépôts de surface de la région du Lac Brisson (SNRC 24A). Direction Générale de Géologie Québec, Québec ; RP 2016-03, 22 pages.

Durkalec A., C. Furgal , M. W Skinner and T.Sheldon. 2014. Investigating Environmental Determinants of Injury and Trauma in the Canadian North. Int. J. Environ. Res. Public Health 2014, 11, 1536-1548.

Drake, D.A.R., Bradie, J.N., Ogilvie, D., Casas-Monroy, O., and Bailey, S.A. 2020. Effectiveness of ballast water exchange plus treatment as a mechanism to reduce the introduction and the establishment of aquatic invasive species in canadian ports. Secr. can.

Environnement et Changement climatique Canada (ECCC) 2017. Fleuve Saint-Laurent : aperçu. Disponible au : https://www.canada.ca/fr/environnement-changement-climatique/services/fleuve-saint-laurent.html

Environnement Canada, 2012. Plan d'action pour les sites contaminés fédéraux (PASCF) : Document d'orientation sur l'évaluation du risque écotoxicologue Plusieurs modules publiés depuis 2012.

Environment and natural resources Canada. Revised Technical guidance on how to conduct effluent plume delineation studies. 2003. [Online]: https://www.canada.ca/content/dam/eccc/migration/main/esee-eem/e93ae5bc-89c6-4701-aed7-fef2a4ac2d7a/plume_delineation_report_e.pdf

Environnement and natural resources. 2023. Weather, Climate and Hazard. Past weather and climate. [Online] : https://climat.meteo.gc.ca/climate_normals/index_e.html

Environnement Canada and Ministère du Développement durable, de l'Environnement et des Parcs du Québec (MDDEP). 2007. Criteria for the Assessment of Sediment Quality in Quebec and Application Frameworks: Prevention, Dredging and Remediation. 39 pages.

Fisheries Act. R.S.C., 1985, c. F-14. [Online]: https://laws-lois.justice.gc.ca/eng/acts/f-14/

Fisheries and Oceans Canada (DFO). 2023. Map of aquatic species at risk. [Online]: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-fra.html

Fisheries and Oceans Canada (DFO). 2022. Best Management Practices for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador. St. John's, NL. vi + 80 p. [Online]: https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/41030217.pdf

Fisheries and Oceans Canada (DFO) 2022. Aquatic Species at risk Map. [Online]: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

Fisheries and Oceans Canada (DFO). 2022. Measures to protect fish and fish habitat. [Online]: https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html.

Fisheries and Oceans Canada (DFO). 2021. Biophysical and Ecological Overview of a Study Area within the Labrador Inuit Settlement Area Zone. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2021/003.

Fisheries and Oceans Canada (DFO). 2020a. Interim code of practice: temporary cofferdams and diversion channels [Online]: https://www.dfo-mpo.gc.ca/pnw-ppe/codes/cofferdams-batardeaux-eng.html

Fisheries and Oceans Canada (DFO) 2020b. Interim code of practice: temporary stream crossings. [Online]: https://www.dfo-mpo.gc.ca/pnw-ppe/codes/temporary-crossings-traversees-temporaires-eng.html

Fisheries and Oceans Canada (DFO) 2019a. Policy for Applying Measures to Offset Adverse Effects on Fish and Fish habitat under the Fisheries Act. [Online]: https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/40939698.pdf?_gl=1*1vqacgy*_ga*NTk0MjIyNTE0LjE2NjQ1NTI5ODU.*_ga_7CCSB32R7T*MTY3NDMzMDczMC4xLjEuMTY3NDMzMDk1Ni4wLjAuMA

Fisheries and Oceans Canada (DFO) 2019b. Fish and Fish Habitat Protection Policy Statement [Online]: https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/40971193.pdf?_gl=1*1y1kpka*_ga*NTk0MjIyNTE0LjE2NjQ1NTI5ODU.*_ga_7CCSB32R7T*MTY3NDMzMDczMC4xLjEuMTY3NDMzMTExNC4wLjAuMA.

Fisheries and Oceans Canada. 2018. Pathways of Effects. [Online]: https://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html

Fisheries and Oceans Canada (DFO) 2013. Identification of additional Ecologically and Biologically Significant Areas (EBSAs) within the Newfoundland and Labrador Shelves Bioregion. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/048.

Fontaine, P. (2004, 23 janvier). Le port de Sept-Îles redevient le deuxième port en importance au Canada. Radio-Canada - Ici Côte-Nord [Online]: https://ici.radio-canada.ca/nouvelle/2044037/port-industrie-fer-aluminium-volume-record

Gagnon-Poiré, A., 2016. Sédimentation tardi-quaternaire glaciaire à post-glaciaire dans trois fjords lacustres adjacents du sud-est du Bouclier Canadien. Laval University, Quebec City, Qc. Master thesis. 112p.

GCC (Garde côtière canadienne) 2020 . Avis aux navigateurs – NOTMAR, 2020. « Lignes directrices pour les mammifères marins et les zones de protection marine »
[Online] :https://www.notmar.gc.ca/publications/annualannuel/section-a/a5-fr.php

Gionet, Linda, et Shirin Roshanafshar. 2013. « Certains indicateurs de la santé des membres des Premières Nations vivant hors réserve, des Métis et des Inuits », Coup d'œil sur la santé, produit no 82-624-X au catalogue de Statistique Canada.

Gouvernement du Canada. 2023a. Modèle de lignes directrices adaptées relatives à l'étude d'impact pour les projets désignés visés par la *Loi sur l'évaluation d'impact*. [Online]: https://www.canada.ca/fr/agence-evaluation-impact/services/politiques-et-orientation/guide-practitioner-evaluation-impact-federale/modele-lignes-directrices-relatives-etude-impact-projets-loi-evaluation-impact.html

Gouvernement du Canada. 2023b. Liste des espèces en péril – Annexe 1.
[Online] :https://laws.justice.gc.ca/fra/lois/S-15.3/page-10.html#docCont

Gouvernement du Canada. 2023c. Guide des plantes envahissantes.
[Online] :https://publications.gc.ca/collections/collection_2017/acia-cfia/A104-97-2017-fra.pdf

Government of Canada. 2023. National Air Pollution Surveillance (NAPS) Program.
[Online]. https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b
(Page viewed on June 2023)

Government of Canada. 2023. Background on earthquakes in eastern Canada. [Online]. https://www.seismescanada.rncan.gc.ca/zones/eastcan-en.php (Viewed on July 10, 2023)

Government of Canada. 2022. Measures to protect fish and fish habitat.
[Online]: https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html

Government of Canada. 2022. Strategic Assessment of Climate Change: A New Impact Assessment System. [Online]: https://www.strategicassessmentclimatechange.ca/https://www.strategicassessmentclimatechange.ca/

Gouvernement du Canada, août 2021, Guide technique lié à l'évaluation stratégique des changements climatiques : Orientation sur la quantification des émissions nettes de GES, les impacts sur les puits de carbone, les mesures d'atténuation, le plan pour atteindre des émissions nettes nulles et l'évaluation des GES en amont.

Government of Canada, August 2021, Draft Technical Guide Related to The Strategic Assessment of Climate Change: Guidance on quantification of net GHG emissions, impacts on carbon sinks, mitigation measures, net-zero plan and upstream GHG assessment, 95p. [Online]: https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html

Government of Canada. 2023. National Inventory Report 1990–2021: Greenhouse Gas Sources and Sinks in Canada. [Online]: https://publications.gc.ca/collections/collection_2023/eccc/En81-4-2021-2-eng.pdf

Government of Canada. 2016. Voisey's Bay Mine and Mill Environmental Assessment Panel Report. [Online]: https://iaac-aeic.gc.ca/archives/evaluations/5EA5DD6D-1/default_lang=En_n=0A571A1A-1.html

Gouvernement du Canada. Administrateur en chef de la santé publique. 2008. Rapport sur l'état de la santé publique au Canada, 2008, produit no HP2-10/2008E au catalogue. Ottawa

Government of Newfoundland & Labrador. 2022. Support for Critical Mineral Exploration in Newfoundland and Labrador. [Online]: https://www.gov.nl.ca/releases/2022/iet/1220n02/

Government of Newfoundland & Labrador. 2023. *Our Critical Minerals Advantage, A Plan to Maximize the Value of Newfoundland and Labrador's Critical Minerals Resources.* [Online]: https://www.gov.nl.ca/iet/files/Critical-Minerals-Plan-Our-Critical-Minerals-Advantage.pdf

Government of Newfoundland & Labrador. 2023a. Environment and Climate Change, *Wilderness and Ecological Reserves*. [Online]: https://www.gov.nl.ca/ecc/natural-areas/wer/

Government of Newfoundland & Labrador. 2023b. Parks NL, *Parks*. [Online]: https://www.parksnl.ca/parks/

Government of Newfoundland & Labrador. 2023c. Fisheries, Forestery and Agriculture, *Plants*. [Online]: https://www.gov.nl.ca/ffa/wildlife/endangeredspecies/plants/#content

Government of Newfoundland & Labrador. Department of Environment and Climate Change (DECC). 2021. Ambient air monitoring report, April 2022. [Online] : https://www.gov.nl.ca/ecc/files/2021-Air-Quality-Annual-Report.pdf, 269p

Government of Newfoundland & Labrador, Air Pollution Control Regulations, 2004 under the Environmental Protection Act (O.C. 2004-232)
[Online]: https://www.assembly.nl.ca/legislation/sr/regulations/Rc040039.pdf#:~:text=Air%20Pollution%20Control%20Regulations%2C%202004%20%2039%2F04%207,the%20standards%20prescribed%20in%20Schedule%20B.%2039%2F04%20s4, 27p.

Government of Newfoundland and Labrador. 2022. Department of Environment and Climate Change. Environmental Assessment. A guide to the Process. May 2022. [Online]: https://www.gov.nl.ca/ecc/files/GUIDE-TO-THE-PROCESS_May-2022.pdf

Government of Newfoundland and Labrador. Environmental Assessment process on Labrador Inuit Lands (LIL). Activity Sheet 11-1. [Online] : https://www.gov.nl.ca/exec/iar/files/lilca_impplan_ch11.pdf

Gouvernement du Québec, 2023a. Premières Nations et Inuits. Profil des nations. Inuit. [Online]: https://www.quebec.ca/gouvernement/portrait-quebec/premieres-nations-inuits/profil-des-nations/inuit

Gouvernement du Québec, 2023b. Premières Nations et Inuits. Profil des nations. Naskapis. [Online]: https://www.quebec.ca/gouvernement/portrait-quebec/premieres-nations-inuits/profil-des-nations/naskapis

Gouvernement du Québec, 2023c. Premières Nations et Inuits. Profil des nations. Innus. Innus | Gouvernement du Québec (quebec.ca)

Gouvernement du Québec. 2020. Plan Québécois pour la valorisation des minéraux critiques et stratégiques 2020-2025. Secteur des mines et la Direction des communications du ministère de l'Énergie et des Ressources naturelles, avec la collaboration de plusieurs ministères et organismes. 54 p. [Online]: https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/energie-ressources-naturelles/publications-adm/plan-strategique/PL_valorisation_mineraux_critiques_strategiques.pdf

Gouvernement du Québec, 2014. Inventaire des caribous du troupeau de la rivière George - Les autorités du Québec et de Terre-Neuve-et-Labrador poursuivent leurs travaux [Online]: http://www.fil-information.gouv.qc.ca/Pages/Article.aspx?idArticle=2208152268

Gouvernement du Québec. 2012. Plan d'action pour le changement climatique pour 2013-2020. 55p. [Online] : https://www.environnement.gouv.qc.ca/changements/plan_action/pacc2020-en.pdf

Gouvernement du Québec. 2005. Guide de la dispersion atmosphérique. 22p + Annexes. [Online] : https://www.environnement.gouv.qc.ca/air/atmosphere/guide-mod-dispersion.pdf

Greenhouse Gas Protocol. [Online] : https://ghgprotocol.org/

Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC). 2022. Changements climatiques 2022 : impacts, adaptation et vulnérabilité, sixième rapport d'évaluation

Hayes, C., Cooper, M., Guay, P. 2013. Report on the 2011 Exploration Drilling Programs Strange Lake Project: Quest Rare Minerals Ltd. Strange Lake Claims NTS: 24A/08, 61 pages.

Health Canada. 2022. *Interim Guidance Document for the Health Impact Assessment of Designated Projects under the Impact Assessment Act*. Draft for review. June 30, 2022.

Health Canada, Revised 2011. *Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials* (NORM). 61 p.

Health Canada, November 2021. *Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials*, Volume III: Transportation.

Health Canada. 2018. *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Country Foods.* 46 p. [Online]: https://publications.gc.ca/collections/collection_2018/sc-hc/H129-54-5-2018-eng.pdf

Health Canada. 2017. *Guidance for evaluating Human Health Impacts in Environmental Assessment: Noise*. 54 p. [Online]: https://iaac-aeic.gc.ca/050/documents/p80054/119378E.pdf

Health Canada. 2016. *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Radiological Impacts.* 41 p. [Online]: https://publications.gc.ca/collections/collection_2017/sc-hc/H129-54-4-2017-eng.pdf.

Health Canada, Revised 2011. Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM). 61 p.

Hémond M., 2012. LE PLAN NORD ET LA NATION NASKAPIE DE KAWAWACHIKAMACH : DÉVELOPPEMENT D'UNE COMMUNAUTÉ AUTOCHTONE. Essai présenté au Centre Universitaire de Formation en Environnement en vue de l'obtention du grade de maître en Environnement (M.Env.). 71 p.

Hooper, R., J. Bolton, A. Whittick, B. Bennett, and S. Murray. 1978. Marine vegetation of the central Labrador coast. I. Intertidal, II. Subtidal. Br. Phycol. J. 13:202.

Hooper, R. and A. Whittick, 1984. The benthic marine algae of the Kaipokok Bay, Makkovik Bay, and Big River region of the central Labrador coast. Naturaliste Canadien. 111:131-138

Horn, O. K., H. Jacobs-Whyte, A. Bruegl, G. Paradis et A.C. Macaulay. 2007. « Incidence and prevalence of type 2 diabetes in the First Nation community of Kahnawa:ke, Quebec, Canada, 1986-2003 ». Canadian Journal of Public Health, vol. 98, no 6, p. 438-43.

Impact Assessment Agency of Canada. 2020. *Analyzing Health, Social and Economical Effects under the Impact Assessment Act*. 43 p. [Online]: https://www.canada.ca/content/dam/iaac-acei/documents/policy-guidance/analyzing-health-social-economical-effects/analyzing-health-social-and-economical-effects-under-the-impact-assessment-act.pdf

ICMM (International Council on Mining & Metals). 2021. Hazard Assessment or Ores and Concentrates for Marine Transport. Guidance, 2021.

Inuit Tapiriit Kanatami. 2023. [Online] : https://www.itk.ca/about-canadian-inuit/ (Page viewed in May 2023).

Innu Takuaikan Uashat Mak Mani Utenam. 2017. Plan de santé 2018-2023. 138 p. et annexes.

Innu of Sheshatshiu and Natuashish, 2014. The Innu Healing Strategy. An Innu plan- jointly developed by the Innu of Sheshatshiu and Natuashish. April 2014. 65 p.

Institut de la statistique du Québec. Enquête québécoise sur la santé de la population (EQSP), 2014-2015. Rapport de l'onglet Plan national de surveillance produit par l'Infocentre de santé publique à l'Institut national de santé publique du Québec.

Institut Nordique de Recherche Environnement et Santé au Travail (INREST), Janvier 2016, Étude sur la qualité de l'air - Rapport final Territoire de la Ville de Sept-Îles, [Online] : https://inrest.ca/wp-content/uploads/2020/01/rapport_qualite_air_inrest.pdf, 139p

Intergovernmental Panel on Climate Change (IPCC). 2022. Climate Change 2022: Impacts, Adaption and Vulnerability, Sixth Assessment Report.

International Maritime Organization, 2014. Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life, MEPC.1/Circ.833. London, U.K: IMO Publishing. 8 p.

Iron Ore Company of Canada (IOCC) Ltd. 1985. Economic Evaluation Study.

Intergovernmental Panel of Climate Change (IPCC). 2000. Land Use, Land Use Change, and Forestry. [Online]: https://www.ipcc.ch/report/land-use-land-use-change-and-forestry/

Joubert, K. et R. Baraldi. 2016. La santé des Québécois : 25 indicateurs pour en suivre l'évolution de 2007 à 2014. Résultats de l'Enquête sur la santé dans les collectivités canadiennes, Québec, Institut de la statistique du Québec, 143 p.

JWEL (Jacques Whitford Environmental Ltd). 1996. Voisey's Bay 1995 Environmental Baseline Technical Data Report: Marine Program. Prepared for Voisey's Bay Nickel Company Limited, St. John's, NL. ix + 78 pp., + 3 appendices.

JWEL (Jacques Whitford Environmental Limited). 1997a. Voisey's Bay 1996 Environmental Baseline Technical Data Report: Marine Fauna. Prepared for Voisey's Bay Nickel Company Limited, St. John's, NL. iii + 52 pp., + 4 appendices.

JWEL (Jacques Whitford Environmental Limited). 1997b. Voisey's Bay 1996 Environmental Baseline Technical Data Report: Coastal Geomorphology. Prepared for Voisey's Bay Nickel Company Limited, St. John's, NL. iii + 43 pp., + 9 appendices.

JWEL (Jacques Whitford Environment Limited.). 1997c. Voisey's Bay 1996 Environmental Baseline Technical Data Report – Avifauna. 56 p. and appendix.

Kelly, J., Power, R., Noble, L., Meade, J., Kelly, J., Reid, K., Kuehnemund, S., Carley, C., Grant, C., Roberge, M. and Lee, E., 2009. A system for characterizing and quantifying coastal marine habitat in Newfoundland and Labrador. Fisheries and Oceans Canada, Marine Environment and Habitat Management, St. John's NL, 81.

Khayyat Kholghi, M., G. Bartlett, M. Phillips, J. Salsberg, A.M. McComber et A.C. Macaulay. 2017. « Evaluating an Indigenous health curriculum for diabetes prevention: engaging the community through talking circles and knowledge translation of results ». Family Practice, vol. 35, no 1, p. 80-87. DOI 10.1093/fampra/cmx068

King, M., A. Smith et M. Gracey. 2009. « Indigenous Health Part 2: The Underlying Causes of the Health Gap ». The Lancet, vol. 34, p. 6-85

Kumar M. B. et Tjepkema M. 2019. Taux de suicide chez les Premières Nations, les Métis et les Inuits (2011 à 2016) : résultats de la Cohorte santé et environnement du recensement canadien (CSERCan) de 2011. Enquête nationale auprès des ménages : Peuples autochtones. Statistique Canada.

Labrador-Grenfell Health, 2023. About us. [Online] : https://www.lghealth.ca/about-us/ (Page consulted in May 2023).

Lachance, D., G. Fortin et G. Dufour Tremblay. 2021. *Identification et délimitation des milieux humides du Québec méridional – décembre 2021*, Québec, ministère de l'Environnement et de la Lutte contre les changements climatiques, Direction adjointe de la conservation des milieux humides, 70 p. + annexes, [Online]: https://www.environnement.gouv.qc.ca/eau/rives/guide-identif-dellimit-milieux-humides.pdf.

Lafrance, I., Bandyayera, D., Charrette, B., Bilodeau, C., David, J., 2016. Geology of the Brisson Lake area (NTS 24A). Ministère de l'Énergie et des Ressources naturelles, Québec; RG 2015-05, 61 pages.

Leduc. R. 2005. Guide de la modélisation de la dispersion atmosphérique, Québec, MDDEP. Direction du suivi de l'état de l'environnement, envirodoq no ENV/2005/0072, rapport no QA/49, 38p

L'Hérault, E., M. Allard (2018). Production de la 2ieme approximation de la carte de pergelisol du Québec en fonction des paramètres géomorphologiques, écologiques et des processus physiques liées au Climat. Produit pour le compte du Ministère des Forêts, de la Faune et des Parcs. Centre d'études nordiques, Université Laval, Québec, 61 p.

Malavoi, J.R., and Y. Souchon. 2002. Description standardise des principaux faciès d'écoulement observables en rivière: clé de détermination qualitative et mesures physiques. Bull. Fr. Pêche Piscic. 365/366: 357-372.

Mandaville, S.M. 2002. Benthic Macroinvertebrates in Freshwaters - Taxa Tolerance Values, Metrics, and Protocols. Soil and Water Conservation Society of Metro Halifax. 47 p. and annexes.

McCarthy, J.H., C. Grant, and D. Scruton. 2010. Standard Methods Guide for the Classification and Quantification of Fish Habitat in Rivers of Newfoundland and Labrador for the Determination of Harmful Alteration, Disruption or Destruction of Fish Habitat. Revised Draft. Fisheries and Oceans, St. John's, NF.

McClenaghan, M.B., Paulen, R.C., Kjarsgaard, and Fortin, R. 2017. Rare earth element indicator minerals: an example from the Strange Lake deposit, Quebec and Labrador, eastern Canada. Geological Survey of Canada Open File 8345.

Metal and Diamond Mining Effluent Regulations (MDMER). 2023. SOR/2002-222. Fisheries Act. [Online] : https://laws-lois.justice.gc.ca/eng/regulations/sor-2002-222/FullText.html

MICON, 2012. Technical Report for the Strange Lake B-Zone Rare Earth Element (REE) Deposit, Québec, Canada, Updated Mineral Resource Estimate, effective date August 31, 2012. December 14, 2012.

MICON, 2014. Torngat Rare Minerals Ltd. NI 43-101 Technical Report on the Preliminary Economic Assessment (PEA) for the Strange Lake Property, Quebec, Canada. Amended Report Date June 26, 2014.

MICON, 2017. NI 43-101 Technical Report for the Updated Mineral Resource Estimate for the Strange Lake Property, Québec, Canada. March 8, 2017

MICON. 2019. Torngat Metals LTD. NI 43-101 Technical Report on the Preliminary Economic Assessment for the Updated Mineral Resource Estimate for the Strange Lake Property, Québec, Canada. Report Date: December 6, 2019 Effective Date of Mineral Resource Estimate: October 31, 2019 Effective Date of PEA Study: November 27, 2019 Micon International Limited Qualified Persons. 318 p.

Migratory Birds Convention Act, 1994. (S.C. 1994c.22). [Online]: https://laws-lois.justice.gc.ca/eng/acts/m-7.01/

Miller, R.R., Heaman, L.M., Birkett, T.C., 1997. U-Pb zircon age of the Strange Lake peralkaline complex: implications for Mesoproterozoic peralkaline magmatism in north-central Labrador. Precambrian Research; volume 81, pages 67-82.

Ministère de la Culture et des Communications (MCC). 2023. *Inventaire des sites archéologiques du Québec (ISAQ)*, 2023.

Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP). 2007. Calculation and Interpretation of Effluent Discharges Objectives for Contaminants in the Aquatic Environment, 2nd Edition. ISBN-978-2-550-49172-9, 54 p. and appendix.

Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP). 2012. Directive 019 sur l'Industrie minière. [Online] : https://environnement.gouv.qc.ca/milieu_ind/directive019/directive019.pdf

Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP). 2009. Fiche #8. Baie des Sept-Îles. 15 p. [Online]: http://www.protegerlenord.mddep.gouv.qc.ca/memoires/baie-septiles-fiche-info.pdf

Ministère du Développement durable, Environnement et Parcs (MDDEP). Juin 2010. Évaluation de la qualité de l'air à Sept-Îles, [Online] : https://www.environnement.gouv.qc.ca/air/sept-iles/rapport2009.pdf, 42p

Ministère du Développement durable, Environnement et Parcs (MDDEP). Avril 2005. Guide de la modélisation de la dispersion atmosphérique, [Online] : https://www.environnement.gouv.qc.ca/air/atmosphere/guide-mod-dispersion.pdf, 39p

Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). 2020, Guide de caractérisation des résidus miniers et du minerai. [Online] : https://www.environnement.gouv.qc.ca/Industriel/secteur-minier/guide-caracterisation-minerai.pdf

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023a. Espèces exotiques envahissantes. [Online]: https://www.environnement.gouv.qc.ca/biodiversite/especes-exotiques-envahissantes/index.asp#:~:text=Une%20esp%C3%A8ce%20exotique%20envahissante%20(EEE,peut%20former%20des%20populations%20dominantes.

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023b. Carte interactive des milieux humides potentiels. [Online] : https://services-mddelcc.maps.arcgis.com/apps/webappviewer/index.html?id=425faf9d70594a52ab1bda37cc905c0f&extent=-8136889.9892%2C5804709.1598%2C-7902075.4383%2C5909886.5107%2C102100&showLayers=Themes_publics_1173%3BThemes_publics_1173_41%3BThemes_publics_1173_20%3BThemes_publics_1173_25%3BThemes_publics_1173_99%3BThemes_publics_1173_74%3BThemes_publics_1173_75%3BThemes_publics_1173_2%3BThemes_publics_1173_37%3BThemes_publics_1173_4%3BThemes_publics_1173_12

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023c. Habitats d'espèces floristiques menacées ou vulnérables. [Online]: https://www.environnement.gouv.qc.ca/biodiversite/habitats/index.htm

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023d. Aires protégées au Québec – March 31, 2023 Version. [Online] : https://services-mddelcc.maps.arcgis.com/apps/MapSeries/index.html?appid=8e624ac767b04c0989a9229224b91334

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023e. Liste des espèces floristiques désignées menacées ou vulnérables ou susceptibles de l'être. [Online]: https://www.environnement.gouv.qc.ca/biodiversite/especes-designees-susceptibles/index.htm

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023f. Outil de détection des espèces exotiques envahissantes – SENTINELLE. [Online] : https://www.pub.enviroweb.gouv.qc.ca/scc/Catalogue/ConsulterCatalogue.aspx

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023g. Directive pour la réalisation d'une étude d'impact sur l'environnement - Projet d'usine de séparation et de purification de terres rares sur le territoire de la municipalité de Sept-Îles. Dossier 3211-14-043, 23 novembre 2023.

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC), 2022. Québec annonce son intention de protéger l'archipel des Sept Îles sur la Côte-Nord, 17 février 2022. [Online]: https://www.quebec.ca/nouvelles/actualites/details/quebec-annonce-son-intention-de-proteger-larchipel-des-sept-iles-sur-la-cote-nord-38061.

Ministère des Ressources naturelles et des Forêts (MRNF). 2023. Carte interactive Forêt ouverte. [Online]: https://www.foretouverte.gouv.qc.ca/?context=_ecologie&zoom=5&center=-69.69531,54.57766&invisiblelayers=*&visiblelayers=ea5bce41cf896ed4680348eb0eeb001c,1da64ddfeaf23710b8a9ad95133fb5d8

Ministère de l'Environnement, de la Lutte contre les Changements Climatiques, de la Faune et des Parcs (MELCCFP). 2022. Guide de quantification des émissions de gaz à effet de serre.111p. + Annexes. [Online]:https://www.environnement.gouv.qc.ca/changements/ges/guide-quantification/guide-quantification-ges.pdf.

Ministère de l'Environnement, de la Lutte contre les Changements Climatiques, de la Faune et des Parcs (MELCCFP). 2022b.

Ministère de l'Environnement, et de la Lutte contre les changements climatiques (MELCC). 2022. *Protocole d'échantillonnage pour le suivi des substances toxiques dans la chair de poisson de pêche sportive en eau douce.* Direction générale du suivi de l'état de l'environnement, 6p. et 3 annexes [Online]: https://www.environnement.gouv.qc.ca/eau/eco_aqua/toxique/Protocole_echantillonnage.pdf

Ministère de l'Environnement, de la Lutte contre les Changements Climatiques, de la Faune et de Pacrs (MELCCFP). 2024. Critères de qualité de l'eau de surface au Québec. [Online]: https://www.environnement.gouv.qc.ca/eau/criteres_eau/index.asp

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2023. Renseignements préliminaires pour la réalisation d'un projet en milieu nordique. [Online]: https://www.environnement.gouv.qc.ca/evaluations/renseign-prelim.htm

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP), 1 Mars 2023, Règlement sur l'assainissement de l'atmosphère, Annexe K, Clean Air Regulations (c. Q-2, r. 4. 1) [Online]: https://www.legisquebec.gouv.qc.ca/fr/pdf/rc/Q-2,%20R.%204.1.pdf, 116p

Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). 2022. *Annexe I Autre renseignements requis pour un projet minier (Mine ou usine de traitement de minerai*. [Online] : https://www.environnement.gouv.qc.ca/evaluations/directive-etude-impact/minier.pdf

Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). 2022. Calculation and Interpretation of Environmental Discharge Objectives for Aquatic Contaminants, Quebec, Direction générale du suivi de l'état de l'environnement, ISBN- 978-2-550-91260-6 (pdf), 68 pages and 4 appendices. [Online] : https://www.environnement.gouv.qc.ca/eau/oer/calcul-interpretation-OER.pdf

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP), Février 2017, Préparation et réalisation d'une modélisation de la dispersion des émissions atmosphériques : projets miniers [Online] : https://numerique.banq.qc.ca/patrimoine/details/52327/2976689, 95 p

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). 2006. Traitement des plaintes sur le bruit et exigences aux entreprises qui le génèrent, 1998. Modified 2006. Legal reference LRQ (c.Q-2). 23 p. [Online] : https://www.environnement.gouv.qc.ca/publications/note-instructions/98-01/note-bruit.pdf

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC), 2017. Guide de caractérisation physicochimique de l'état initial du milieu aquatique avant l'implantation d'un projet industriel, Québec, Direction générale du suivi de l'état de l'environnement, ISBN 978-2-550-79556-8, 12 p. + 3 annexes. [Online]: https://www.environnement.gouv.qc.ca/eau/oer/Guide_physico-chimique.pdf

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC). 2017. Radionucléides recommandés pour l'analyse de la radioactivité dans les matrices environnementales. 31 p.

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC) and Environment and Climate Change Canada (ECCC). 2016. Guide for physicochemical and toxicological characterization of sediments. 59 pages + appendices. [Online]: https://publications.gc.ca/collections/collection_2017/eccc/En84-141-2016-eng.pdf

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC). 2016. Guide de caractérisation physicochimique de l'état initial des sols avant l'implantation d'un projet industriel. 21 p.

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC), Décembre 2016, Qualité de l'air à Sept-Îles dans le secteur de Parc-Ferland - Bilan de juin 2014 à mai 2015, [Online] : https://www.environnement.gouv.qc.ca/air/sept-iles/parc-ferland.pdf, 44p

Ministère des Forêts, de la Faune et des Parcs (MFFP). 2018 (unpublished). Protocole d'échantillonnage en milieu nordique pêche expérimentale normalisée des communautés de poissons en lac. Document interne. Secteur des monts Otish (R10)-été 2016, Secteurs Manouane Nord (R02) et Fermont (R09)- été 2017, et Secteur Kawawachikamach (R10)- été 2018. 34 p.

Ministère de l'Énergie et des Ressources Naturelles (MERN), 2022. Guide de préparation du plan de réaménagement et de restauration des sites miniers au Québec. ISBN : 978-2-550- 92682-5 (PDF). 55p. + appendix

Ministère des Ressources naturelles du Québec (MERN); ministère de l'Environnement et de la Faune du Québec, 1997. Guide et modalités de préparation du plan et exigences générales en matière de restauration des sites miniers au Québec. [Online]: http://mern.gouv.qc.ca/publications/mines/restauration/restauration-guifrmin.pdf.

Ministère des Forêts, de la Faune et des Parcs (MFFP). 2021. Recueil des protocoles standardisés d'inventaires acoustiques de chauves-souris au Québec, gouvernement du Québec, Québec, 44 p. + annexes.

Ministère des Ressources naturelles et des Forêts (MRNF), 2020. Province de Churchill, [Online]: https://gq.mines.gouv.qc.ca/lexique-stratigraphique/province-de-churchill/, accès le 28/03/2023

Ministère des Ressources naturelles et des Forêts (MRNF), 2023. Domaine lithotectonique de Mistinibi-Raude, [Online]: https://gq.mines.gouv.qc.ca/lexique-stratigraphique/province-de-churchill/domaine-lithotectonique-de-mistinibi-raude/, accès le 28/03/2023

Ministère des Ressources naturelles et des Forêts (MRNF), 2023 - Carte interactive. Produits et services en ligne Mines, Système d'information géominière du Québec.
[Online]: https://sigeom.mines.gouv.qc.ca/signet/classes/I1108_afchCarteIntr, accès le 29/03/2023

Ministère des Ressources naturelles et des Forêts (MRNF). 2012. Caribous du troupeau de la rivière Gorge – Le MRNF fait connaître les résultats de l'inventaire.
[Online]: http://communiques.gouv.qc.ca/gouvqc/communiques/GPQF/Aout2012/16/c7587.html?slang=en

Ministère des Ressources naturelles et des Forêts (MRNF). 2010. Résultats de l'inventaire du troupeau de caribous de la rivière George.
[Online]: http://communiques.gouv.qc.ca/gouvqc/communiques/GPQF/Novembre2010/09/c2644.html

Ministère de la Santé et des Services sociaux du Québec (MSSS), Service de développement de l'information, Estimations et projections démographiques. Version de janvier 2010.

Ministère de la Santé et des Services sociaux (MSSS). 2022a. Santé publique au Québec. [Online]: https://www.msss.gouv.qc.ca/professionnels/programme-national-de-sante-publique-pnsp/sante-publique-au-quebec/#:~:text=leur%20r%C3%A9gion%20sociosanitaire.-,D%C3%A9terminants%20de%20la%20sant%C3%A9,%C2%AB%20d%C3%A9terminants%20de%20la%20sant%C3%A9%20%C2%BB (May 2023)

Ministère de la Santé et des Services sociaux du Québec (MSSS). 2022b. Rallumer l'espoir. Stratégie nationale de prévention du suicide 2022-2026. 53 p. et annexes.

Ministère des Transports et de la Mobilité Durable (MTMD). 1998. Politique sur le Bruit Routier. [Online] : https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/transports/ministere-des-transports/publications-amd/Politiques_ministerielles/PO_politique_bruit_MTMDET.pdf

Mitsui Mining & Smelting, 1996. Study on Strange Lake Ore (using wet magnetic separation).

National Occupational Classification (NOC). 2021. Canada's national system for describing occupations. [Online]: https://noc.esdc.gc.ca/

National Wetland Working Group. 1997. The Canadian Wetland Classification System. Second edition. Edited by Warner B.G. and C.D.A. Rubec. Wetland Research Center, University of Waterloo, Waterloo.

NATIVE WOMEN'S ASSOCIATION OF CANADA / ASSOCIATION DES FEMMES AUTOCHTONES DU CANADA. 2020a. *Les femmes autochtones et l'évaluation d'impact. Rapport final*. [Online] : https://www.canada.ca/content/dam/iaac-acei/documents/research/nwac-impact-assessment-final-report-fr.pdf
(Page consulted in Decembre 2023)

NATIVE WOMEN'S ASSOCIATION OF CANADA / ASSOCIATION DES FEMMES AUTOCHTONES DU CANADA. 2020b. *Trousse de démarrage. Analyse comparative entre les sexes culturellement pertinente (ACSCP) : Introduction, intégration et exemples d'utilisation*.
[Online] : https://stbbi.nwac.ca/wp-content/uploads/2021/03/NWAC_CRGBA_2020_FR_Final_Web-1.pdf
(Page consulted in Decembre 2023)

Natural Resources Canada, 2024a. Lower St. Lawrence Seismic Zone https://www.seismescanada.rncan.gc.ca/zones/eastcan-en.php#LSLSZ, accessed 22/03/2024

Natural Resources Canada, 2024b. Simplified seismic hazard map for Canada, the provinces and territories. Online: [Online]:https://www.seismescanada.rncan.gc.ca/hazard-alea/simphaz-en.php, accessed 22/03/2024.

Natural Resources Canada, 2024c. Geological Survey of Canada Open File 4459 - Seismic hazard design values. [Online]:https://www.earthquakescanada.nrcan.gc.ca/hazard-alea/OF4459/of4459table1-en.php, accessed 22/03/2024

Natural Resources Canada, 2024d. 2020 National building Code of Canada Seismic Hazard tool. [Online]: https://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/nbc2020-cnb2020-en.php, accessed 22/03/2024.

Nature Québec / UQCN, 2007. ZICO de Sept-Îles : Plan de conservation. 57 p.

Navaneelan, T. et T. Janz. 2014. « Ajuster l'aiguille de la balance : l'obésité dans la population canadienne après correction pour tenir compte du biais des répondants », Coup d'oeil sur la santé, produit no 82-624-X au catalogue de Statistique Canada.

Newfoundland and Labrador Regulation. 2022. Air Pollution Control Regulations, 2022 under the Environmental Protection Act. (O.C. 2022-72). [Online]: https://www.assembly.nl.ca/Legislation/sr/regulations/rc220011.htm

Nunatsiavut Environmental Protection Act. 2012. [Online]. https://www.nunatsiavut.com/wp-content/uploads/2021/06/CIL-31-12-2012-N-5-Nunatsiavut-Environmental-Protection-Act.pdf

Nunatsiavut Government. 2023. Legislation. [Online]. https://nunatsiavut.com/legislation/ https://www.nunatsiavut.com/wp-content/uploads/2021/06/CIL-31-12-2012-N-5-Nunatsiavut-Environmental-Protection-Act.pdf

OBV Duplessis. 2021. *Amélioration des habitats dulcicoles pour les communautés de poissons migratrices de la Baie de Sept-Îles.* Rapport final des volets 1-2. 46 p. + annexes [Online]: https://obvd.qc.ca/wp-content/uploads/2023/02/Rapport_AffluentsMaritime_volet_I_II_OBVD_2021.11.12_annexes.pdf

Organisation des nations unies pour l'alimentation et l'agriculture. 1996. [Online]: Déclaration de Rome sur la sécurité alimentaire mondiale, (Page consulted in May 2023).

Paquin D., A. Mailhot, C. Guay, C. Malenfant, E. Bresson, T. Logan, T. Smith, G. Talbot 2022. Portrait climatique régional en climat de référence et futur en soutien à l'analyse des impacts et de l'adaptation aux changements climatiques sur le territoire Eeyou Istchee Baie-James, du nord de l'Abitibi-Témiscamingue et du Nunavik. Rapport final présenté au ministère des Transports. Ouranos et INRS. 77 pages, annexe A 282 pages, annexe B 181 pages, annexe C 364 pages, total 904 pages.

Paleah Black Moher, Alison Palmer, and Eleanor Setton. 2013. «Mining rare earth» 4p. [Online]: https://www.carexcanada.ca/Timis_Mining_REE.pdf (Page consulted in June 2023)

Pêches et Océans Canada (MPO). 2024. Zones d'importance écologique et biologique. [En ligne] : https://ouvert.canada.ca/data/fr/dataset/d2d6057f-d7c4-45d9-9fd9-0a58370577e0

Pêches et Océans Canada (MPO). 2023. Carte des espèces aquatiques en péril. [En ligne] : https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-fra.html

Pêches et Océans Canada (MPO). 2016. Lignes directrices pour les traversées de cours d'eau au Québec. 73 pages + annexes. [Online] : https://www.foretprivee.ca/wp-content/uploads/2016/05/Lignes_dir_traversees_QC_2016-MPO.pdf

Phillips, M. 2019. A participatory approach to developing a culture-based school health promotion model for elementary students in Kahnawà:ke. PhD. Montréal, McGill University.

Physical Activities Regulations (SOR/2019). 2019. Amended SOR/2023-60, SOR/2021-25. [Online]: https://laws.justice.gc.ca/eng/regulations/SOR-2019-285/index.html

Pillet, D., 1985. Le granite peralcalin du lac Brisson, Territoire du Nouveau-Québec : résultats préliminaires. Ministère de l'Énergie et des Ressources, Québec; MB 85-37, 52 pages, 1 plan.

Project Blue. 2022. [Online]: https://projectblue.com/

Port de Sept-Îles (PSI) 2023. [En ligne] https://www.portsi.com/port/

Publications Québec. 2024. Mining Act. Chapter M-13.1. [Online] : https://www.legisquebec.gouv.qc.ca/en/document/cs/M-13.1

Publications Québec. 2024. Regulation respecting the landfilling and incineration of residual materials. Chapter Q-2, r.19. Environment Quality Act (Chapter Q-2), Act respecting certain measures enabling the enforcement of environmental and dam safety legislation (Chapter M-11.6). [Online]: https://www.legisquebec.gouv.qc.ca/en/document/cr/q-2,%20r.%2019

Publications Quebec. 2011. Clean Air Regulation. Chapter Q-2, r.4.1. Environment Quality Act (Chapter Q-2) [Online]: https://www.legisquebec.gouv.qc.ca/en/document/cr/Q-2,%20r.%204.1

Publications Quebec. 2007. Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere. [Online]: Q-2, r. 15 - Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere (gouv.qc.ca)

Régie régionale de la santé et des services sociaux Nunavik, en collaboration avec l'Institut national de santé publique du Québec (RRSSN et INSPQ). 2015. Portrait de santé du Nunavik en 2015 : les enjeux chez les jeunes, les adultes et les personnes âgées, Gouvernement du Québec, 90 pages et annexes.

Rohrer, J. E., A. Arif, A. Denison, R. Young et S. Adamson. 2007. « Overall self-rated health as an outcome indicator in primary care », Journal of Evaluation in Clinical Practice, vol. 13, no 6, p. 882 à 888.

Reading C.L. et F. Wein. 2009. Health inequalities and social determinants of Aboriginal peoples' health. Prince George (C.-B.), National Collaborating Centre for Aboriginal Health.

Rescan Environmental Services Limited (RESL).1997. Physical Oceanography of the Voisey's Bay Project Area. Prepared for Voisey's Bay Nickel Company Limited, St. John's, NL. v + 38 pp., + 6 appendices

Réseau d'observation de mammifères marins (ROMM). 2021. Ships and whales in the Northwest Atlantic. A Guide for the Marine Industry. Rivière-du-Loup, Quebec. Shipping Federation of Canada and Dalhousie University. 78 p.

Ressources naturelles Canada. 2022. Stratégie canadienne sur les minéraux critiques : de l'exploration au recyclage : alimenter l'économie verte et numérique du Canada et du monde entier. 55 p. [En ligne] : https://www.canada.ca/content/dam/nrcan-rncan/site/critical-minerals/Critical-minerals-strategy_FR_9dec.pdf

Ressources Naturelles Canada. 2024. Recherche des séismes dans la base de données. [Online] : https://www.seismescanada.rncan.gc.ca/stndon/NEDB-BNDS/bulletin-en.php

Rosol, R., C. Huet, M. Wood, C. Lennie, G. Osborne et G. M. Egeland. 2011. « Prevalence of affirmative responses to questions of food insecurity: International Polar Year Inuit Health Survey, 2007–2008 », International Journal of Circumpolar Health, vol. 70, no 5, p. 488 à 497.

Røstad, S., A., Kaartvedt, S., Klevjer, T. A., and Melle, W. 2006. Fish are attracted to vessels. ICES Journal of Marine Science, 63: 1431e1437.

Santé Canada, 2014. Lignes directrices canadiennes pour la gestion des matières radioactives naturelles (MRN). Rédigées par le Groupe de travail canadien sur les MRN du Comité de radioprotection fédéral-provincial-territorial. 73 p. En ligne : norm-mrn-fra.pdf (canada.ca)

Santé Canada, 2019. Conseils pour l'évaluation des impacts sur la santé humaine dans le cadre des évaluations environnementales : Évaluation des Risques pour la Santé Humaine. 72 p. [Online]: H129-54-6-2019-fra.pdf (publications.gc.ca)

Santé Canada. 2021. Consommation d'alcool. [Online]: https://www.canada.ca/fr/sante-canada/services/dependance-aux-drogues/alcool.html (Page consulted in May 2023)

Santé Canada. 2023. Préoccupations liées à la santé – Le tabagisme et votre corps. [Online]: https://www.canada.ca/fr/sante-canada/services/preoccupations-liees-sante/tabagisme/tabagisme-votre-corps.html (Page consulted in May 2023)

Scott, W.B. and Crossman, , E.J. 1973. Freshwater Fishes of Canada. Bulletin of the Fisheries Research Board of Canada, 184, 966 p.

Service de la faune aquatique (SFA). 2011. Guide de normalisation des méthodes d'inventaire ichtyologique en eaux intérieures, Tome I, Acquisition de données, ministère des Ressources naturelles et de la Faune, Québec, 137 p. [Online] : https://mffp.gouv.qc.ca/documents/faune/normalisation-inventaire-ichtyologique.pdf

Sevunts, L. (September 29) 2017. Inuit traditional knowledge to guide marine management plan off Labrador coast. Radio Canada International (RCI). [Online] : https://www.rcinet.ca/en/2017/09/29/inuit-traditional-knowledge-to-guide-marine-management-plan-off-labrador-coast/

SEM (Sikumiut Environmental Management Ltd.) 2013. Quest Rare Minerals Ltd Strange Lake B-Zone Biological and Environmental Baseline Surveys Marine Surveys of Port Options 2012. 265p.

Slabbekoorn, H. N., B.Bouton, I. van Opzeeland, A.Coers, C.t enCate and A.N. Popper. 2010. A noisy spring: the impact of globally rising underwater sound levels on fish. Trends in Ecology & Evolution, 2010, Vol. 25, No. 7, 419-427 ref. 98.

Société Alzheimer, 2023. La maladie de Huntington. [Online]: https://alzheimer.ca/fr/au-sujet-des-troubles-neurocognitifs/autres-formes-de-troubles-neurocognitifs/troubles-2 (Page consulted in May 2023)

Sooley, D.R., E.A. Luiker, and M.A. Barnes. 1998. Standard Methods Guide for Freshwater Fish and Fish Habitat Surveys in Newfoundland and Labrador: Rivers & Streams. Fisheries and Oceans, St. John's NF. iii+50 pp.

Species at risk (S.C. 2002, c. 29). [Online]: https://laws.justice.gc.ca/eng/acts/s-15.3/

Stenson, G.B. and D.J. Kavanagh. 1994. Distribution of harp and hooded seals in offshore waters of Newfoundland. NAFO Sci. Coun. Studies 21: 121-142.

Statistique Canada. 2013a. « Consommation abusive d'alcool, 2012 », Feuillets d'information sur la santé, produit no 82-62-X au catalogue de Statistique Canada.

Statistique Canada. 2013b. Région de la Côte-Nord (Région Sociosanitaire), Québec et Québec (tableau). Profil de la santé. Produit nº 82-228-XWF au catalogue de Statistique Canada. Ottawa. Diffusé le 12 décembre 2013.
[Online]: https://www12.statcan.gc.ca/health-sante/82-228/details/page.cfm?Lang=F&Tab=1&Geo1=HR&Code1=2409&Geo2=PR&Code2=24&Data=Rate&SearchText=Qu%C3%A9bec&SearchType=Contains&SearchPR=01&B1=All&Custom=&B2=All&B3=All &GeoLevel=PR&GeoCode=24

Statistique Canada. 2013c. Profil de la santé. 2013. [Online]: https://www12.statcan.gc.ca/health-sante/82-228/details/page.cfm?Lang=F&Tab=1&Geo1=HR&Code1=1014&Geo2=PR&Code2=10&Data=Rate&SearchText=Terre-Neuve-et-Labrador&SearchType=Contains&SearchPR=01&B1=All&Custom=&B2=All&B3=All&GeoLevel=PR&GeoCode=10 (Page consulted in May 2023)

Statistique Canada. 2015. Santé des Inuits : certains résultats de l'Enquête auprès des peuples autochtones de 2012. [Online]: https://www150.statcan.gc.ca/n1/pub/89-653-x/89-653-x2014003-fra.htm#n1 (Page consulted May 2023)

Statistique Canada. 2016a. Enquête auprès des peuples autochtones de 2012. Évaluation des déterminants sociaux de la santé autodéclarée des Inuits de l'Inuit Nunangat.
[Online]: https://www150.statcan.gc.ca/n1/pub/89-653-x/89-653-x2016009-fra.htm

Statistique Canada. 2016b. Tableau 13-10-0457-01 Indicateurs de la santé, selon l'identité autochtone, estimations pour une période de quatre ans. Enquête sur la santé dans les collectivités canadiennes (ESCC).

St. Lawrence 2011-2026 Action Plan. (2017). Navigation on the St. Lawrence Echo of the Past, Path to the Future. Government of Quebec. [Online]: https://www.planstlaurent.qc.ca/fileadmin/site_documents/documents/Usages/Navigation_St-LaurentANG.pdf

Tait, Heather. 2008. Enquête auprès des peuples autochtones, 2006 : santé et situation sociale des Inuits, produit no 89-637-X – no 001 au catalogue de Statistique Canada.

Tarasuk, V. 2009. « Health implications of food insecurity », Social Determinants of Health: Canadian Perspectives, deuxième édition, publié sous la direction de Dennis Raphael, Toronto, Canadian Scholars' Press Inc.

Tardif, B., J. Faubert et G. Lavoie. 2019. Les bryophytes rares du Québec, seconde édition. Société québécoise de bryologie et gouvernement du Québec, ministère de l'Environnement et de la Lutte contre les changements climatiques, Direction générale de l'écologie et de la conservation, avec la contribution du Centre de données sur le patrimoine naturel du Québec, Québec, x + 332 p. [Online]: http://www.societequebecoisedebryologie.org/documents/Bryo_rares_Qc_2_version_2.pdf

Terrapex, 2014. Highlights on 2013 Environmental geochemical testing program for water quality seeping from mine rock piles, strange lake project. Technical memorandum. 54 p.

Terrapex, 2013. Preliminary Geochemical Characterization of two (2) samples of Enriched Ore and one (1) sample of leach residue, Strange Lake Project: Highlights from an Environmental Perspective. Technical memorandum. 29 pagesTherriault Y. et collaborateurs. 2018. Portrait de santé et de bien-être de la population nord-côtière, Baie-Comeau, Centre intégré de santé et de services sociaux de la Côte-Nord, Direction de santé publique, 200 p.

Therriault Y. et collaborateurs. 2018. Portrait de santé et de bien-être de la population nord-côtière, Baie-Comeau, Centre intégré de santé et de services sociaux de la Côte-Nord, Direction de santé publique, 200 p.

The Office of Climate Change, Energy Efficiency and Emissions Trading (Newfoundland and Labrador). 2011. Charting our course.Climate change action plan 2011. [Online]. https://uccrnna.org/wp-content/uploads/2017/06/2011_Newfoundland-and-Labrador_Charting-our-Course-Climate-Change-Action-Plan.pdf.

Transport Canada, 2020. « Prévention de la pollution du milieu marin par les navires » https://tc.canada.ca/fr/transport-maritime/securitemaritime/prevention-pollution-milieu-marin-navires [consulté le 20 octobre 2020].

Transport Canada. 2019. Ballast Water Management. [Online]: https://tc.canada.ca/fr/transport-maritime/pollution-marine-intervention-environnementale/empecher-propagation-especes-aquatiques-envahissantes-transport-maritime/gestion-eau-ballast.

Transport Canada. 2017. Oil Spill Preparedness and Response Regime in Canada. Marine Environment - TP 14539. [Online]:https://tc.canada.ca/fr/transport-maritime/securite-maritime/regime-preparation-intervention-cas-deversements-hydrocarbures-milieu-marin-tp-14539-0

U.S. Department of Energy. 2023. Critical Materials Assessment. July 2023. 240 p. [Online]: https://www.energy.gov/sites/default/files/2023-07/doe-critical-material-assessment_07312023.pdf

Vale Inco. 1997. Voisey's Bay Mine/Mill Project Environmental Impact Statement. [Online]: http://vinl.valeinco.com/eis/ (Content Archived).

Ville de Sept-Îles, 2007, Règlement 2007-103, Règlement de zonage, Update 19 décembre 2016.

VBNC (Voisey's Bay Nickel Company Limited). 1997. Voisey's Bay Mine/Mill Project. Environmental Impact Statement. Volume 3, Biophysical Assessment. Chapter X, Marine Environment. v + 53 pp, + 2 appendices.

Young, T.K., J. Reading, B. Elias et J.D. O'Neil. 2000. « Type 2 diabetes mellitus in Canada's First Nations: status of an epidemic in progress ». Canadian Medical Association Journal, vol. 163, no 5, p. 561-566.

Wallace, Susan. 2014. Santé des Inuits : certains résultats de l'Enquête auprès des peuples autochtones de 2012, produit no 89-653-X – no 003 au catalogue de Statistique Canada.

Wardrop. 2010a. Rapport technique. Strange Lake Project, B-Zone Deposit, Québec, National Instrument 43-101 Resource Estimate, April 16, 2010.

Wardrop. 2010b. Rapport technique. Preliminary Economic Assessment on the Strange Lake Project, B-Zone Deposit, September 24, 2010

Wardrop. 2011. Rapport technique. Strange Lake B-Zone Resource Model Update, May 25, 2011

Wilkins, Russel, Sharanjit Uppal, Philippe Finès et autres. 2008. « Espérance de vie dans les régions où vivent les Inuits au Canada, 1989 à 2003 », Rapports sur la santé, vol. 19, no 1, produit no 82-003 au catalogue de Statistique Canada.

Witteck Development Inc., (1982). Hydrometallurgical Study Project 5032-82 for Iron Ore Company of Canada Ltd. (IOCC).

World Resources Institute, (2014). Greenhouse Gas Protocol, Mitigation Goal Standard. [Online]: https://ghgprotocol.org/sites/default/files/standards/Mitigation_Goal_Standard.pdf