

Executive Summary

There is a significant opportunity to replace Iqaluit's current diesel-generated electricity supply with a clean, renewable energy system. The advantages of this replacement are numerous, and include long-term energy security for the community, energy sovereignty for Inuit, and lower electricity costs for Iqalungmiut. There is a strong business case for NNC to supply this electricity as an independent power producer.

Numerous options and alternatives were considered in the Iqaluit region, primarily with a focus on water and wind generation alternatives. A systematic method for evaluation and ranking was employed to determine the preferred alternative for development; this method included assigning equal importance to social (community), environmental, and techno-economic considerations to achieve an informed, balanced ranking. Finally, significant effort was made to achieve community consent and support, which was achieved and is detailed herein.

The McKeand River South alternative, which will be referred to as the Kuugaluk site moving forward, emerged as the preferred alternative by a considerable margin. Not only was this considered a unanimous recommendation from the project team's analysis, but it was also validated and supported by the community, with 76.2% of feedback (via ranked ballot) supporting Kuugaluk as the preferred site. Other alternatives, including wind, scored high and around the project frame and can also be considered throughout Phase 3 activities.

The Kuugaluk alternative is a conventional hydro development with a high-degree of flexibility and scalability during the design phase. It has capacity potential to meet Iqaluit's current needs, plus ample capacity for future community growth and expansion.

Facility Name: Kuugaluk Hydro (Kuugaluk River South)
Facility Type: Conventional Hydro
Facility Capacity: 15MW to 30 MW (double-Francis type turbines)

There are a range of design options within the Kuugaluk development, all of which are competitive with or out-perform the cost of the current diesel system.

The report herein details the decision path to the selection and recommendation of the Kuugaluk Hydro option as the preferred alternative. It is strongly recommended that this project move into Phase 3 – Detailed Design of the Preferred Alternative.

Preamble

Nunavut Nukkiksautiit Corporation (“NNC”) is a wholly-owned subsidiary of **Qikiqtaaluk Corporation (“QC”)**—the for-profit development arm of **Qikiqtani Inuit Association (“QIA”)**. QC, with QIA as its sole shareholder, is 100% Inuit-owned, invests in strategic business opportunities, and is a major contributor to all sectors of the Nunavut economy.

QIA is one of three Regional Inuit Associations affiliated with **Nunavut Tunngavik Inc. (“NTI”)**, an organization tasked with upholding the Nunavut Agreement by working closely with partners and all levels of government to represent Inuit in Inuit Nunangat, the Inuit homeland.

Through the Nunavut Agreement, 356,000 km² (17.7% of the territory’s landmass) is dedicated as **Inuit-Owned Land (“IOL”)**. NTI designates the responsibility of managing that IOL to the Regional Inuit Associations. QIA represents 51% of Inuit living in the territory of Nunavut and manages nearly half of the IOL (which is situated in the Qikiqtani Region) making QIA one of the world’s largest private landowners.

NNC is Nunavut’s first 100% Inuit-owned renewable energy developer. Its mission is to lead Qikiqtani’s clean energy transition on IOL in partnership with communities by establishing sustainable clean energy developments that foster economic, social, and environmental benefits. The company promotes a unique regional-community ownership structure. This approach enables communities to lead projects while easing project development burdens, bringing triple bottom line benefits to Nunavummiut without the strain on municipal resources. Improving access to affordable, clean energy while reducing Nunavut’s reliance on diesel fuel is one of NNC’s top priorities.

Renewable energy projects pursued by NNC are tailored to the individual needs and resources of each community. This is done by selecting the optimal mix of clean energy technologies such as solar, wind, hydro, tidal, and energy storage systems based on the determinants of each community. The primary goal is to develop solutions that are affordable, reliable and accessible that bring maximum benefits to communities.

Through all phases of a renewable energy project lifecycle, including planning, development, project financing, construction, and operations, NNC prioritizes the integration of **Inuit Qaujimagatugangit (“IQ”)**. In particular, the following Inuit Societal Values are actively embodied by NNC’s business activities:

- Ajjiiqatigiinniq: Decision making through discussion and consensus
- Piliriqatigiinniq/Ikajuqtigiinniq: Working together for a common cause
- Qanuqtuurniq: Being innovative and resourceful
- Avatittinnik Kamatsiarniq: Respect and care for the land, animals and the environment

By developing projects with the intent to own them in partnership with communities for the entire life of the infrastructure, NNC strives to ensure all renewable energy projects in Nunavut are technically and financially sound for the benefit of future generations.



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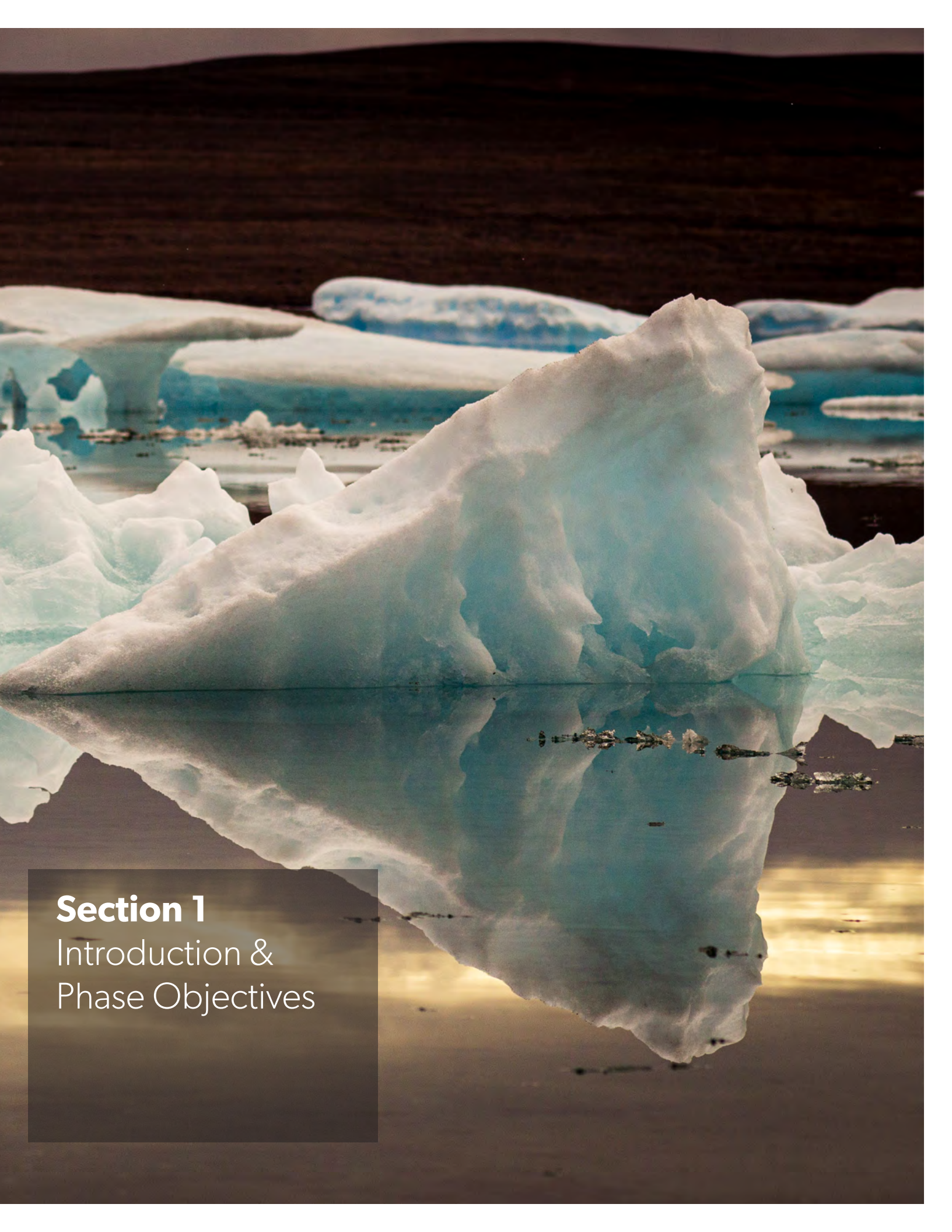
- A Technical Drawings
- B Project Road Mapping
- C CODAS Matrix
- D Alternatives Posters

List of Abbreviations

BESS	Battery Energy Storage System	O&M	Operation and Maintenance
CAPEX	Capital Expenditures	OPEX	Operational Expenditures
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada	PSH	Pumped Water Storage
		QC	Qikiqtaaluk Corporation
CODAS	Combinative Distance Based Assessment	QEC	Qulliq Energy Corporation
CPL	Canadian Projects Ltd.	QIA	Qikiqtani Inuit Association
DFO	Fisheries and Oceans Canada	RE	Renewable Energy
DIO	Designated Inuit Organization	RWO	Regional Wildlife Organization
DSP	Decision Support Package	SEM	Sikumiut Environmental Management Limited
ECCC	Environment and Climate Change Canada		
EIS	Environmental Impact Statement	UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
ETAP	Electrical Transient Analyzer Program		
FAA	Fisheries Act Association	WACC	Weighted Average Cost of Capital
FAO	Food and Agriculture Organization	WSC	Water Survey of Canada
FEED	Front-End Engineering Design	WTG	Wind Turbine Generators
FPIC	Free, Prior, Informed Consent		
FID	Final Investment Decision		
GC	Government of Canada		
GHG	Green House Gasses		
GIS	Geographical Information System		
GN	Government of Nunavut		
GN DOE	Government of Nunavut Department of Environment		
HRDEM	High Resolution Digital Elevation Model		
HTA	Hunters & Trappers Association		
IBC	Inuit Birthright Corporation		
IFT	Issued for Tender		
IIBA	Inuit Impact and Benefit Agreement		
IOL	Inuit Owned Land		
IPP	Independent Power Producer		
IQ	Inuit Qaujimajatuqangit		
IRR	Internal Rate of Return		
ISV	Inuit Societal Values		
ITK	Inuit Tapiriit Kanatami		
LCOE	Levelized Cost of Energy		
LUP	Land-Use Plan		
LVP	Landsvirkjun Power		
NIRB	Nunavut Impact Review Board		
NIWS	Nunavut Inuit Wildlife Secretariat		
NLCA	Nunavut Land Claim Agreement		
NNC	Nunavut Nukkiqsautiit Corporation		
NPC	Nunavut Planning Commission		
NPV	Net Present Value		
NTI	Nunavut Tungavik Inc.		
NuPPAA	Nunavut Planning and Project Assessment Act		
NWB	Nunavut Water Board		







Section 1

Introduction &
Phase Objectives

1.0 Introduction & Phase Objectives

The city of Iqaluit, like other communities across the Canadian Arctic, is reliant on fossil fuels to produce electricity and heat. In Nunavut, Qulliq Energy Corporation operates 25 standalone diesel power plants in 25 communities with a total installed capacity of approximately 76,000 kW (Qulliq Energy Corporation n.d.). Diesel is heavily subsidized in the North by territorial governments and the Government of Canada (“GC”); despite this, Nunavummiut experience some of the highest electricity rates in the country. Burning diesel for power and heat carries risks for Nunavummiut who rely on it, including health issues, substantial carbon footprint and environmental concerns, mechanical malfunctions, and the unreliability of the supply chain. Conversely, harnessing abundant local renewable energy resources like sun, wind, water, and biomass will create economic independence, local jobs, and energy security (Pembina Institute 2020).

The *Iqaluit Nukkiksautiit Project* addresses the opportunity to replace diesel usage in the city of Iqaluit with renewable energy, offsetting the entire electrical load and potentially expanding to accommodate the thermal load and industrial loads, thereby having far reaching positive impacts to diesel reduction efforts in Nunavut. The renewable energy alternatives generated in Phase 2 have been thoroughly evaluated, and a final alternative recommendation will be presented for further exploration in Phase 3: Front End Engineering Design (“FEED”) and Market Evaluation.

This **Phase 2 Decision Support Package (“DSP”)** for Decision Gate 2 of the *Iqaluit Nukkiksautiit Project* (“the Project”) presents the findings and progress of Phase 2; it includes stakeholder and Rightsholder engagement, comprehensive Inuit land use research, environmental and regulatory evaluation, technical feasibility assessment, alternative generation and configuration, and economic and energy modelling.

The *Iqaluit Nukkiksautiit Project* functions according to the phase-gate system, which helps mitigate risk and ensure the optimal solution is carried through, based on support from Iqalungmiut. This approach to project development is broken down into five phases, separated by four gates. The phases constitute the development work, including the execution and completion of critical activities and deliverables. The gates are decision checkpoints, during which the project team presents findings and seeks community feedback and consent to proceed. The project does not proceed to the following phase until agreement and signed approval are obtained from all key project decision-makers, based on the information provided in the phase-specific DSP.

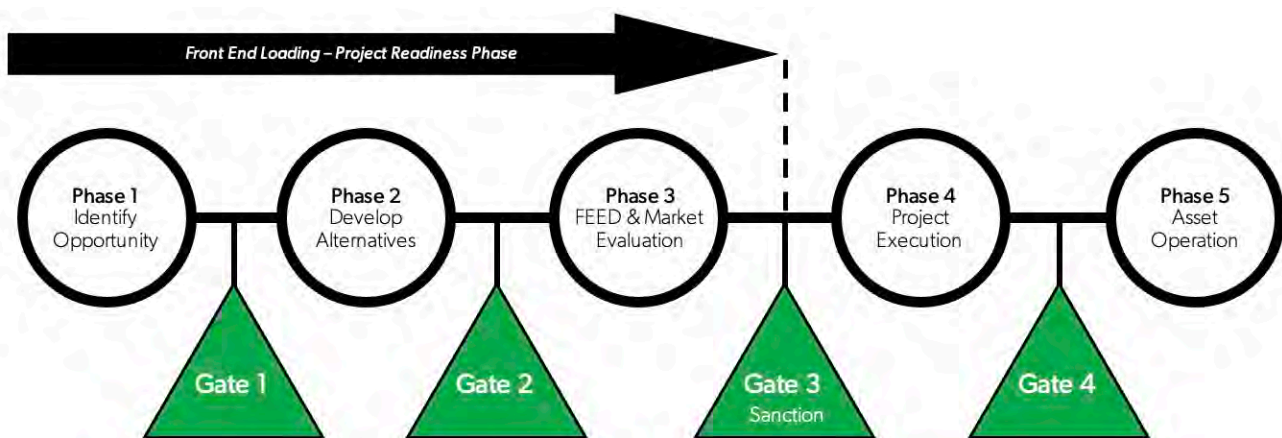


Figure 1 - Phase Gate Diagram

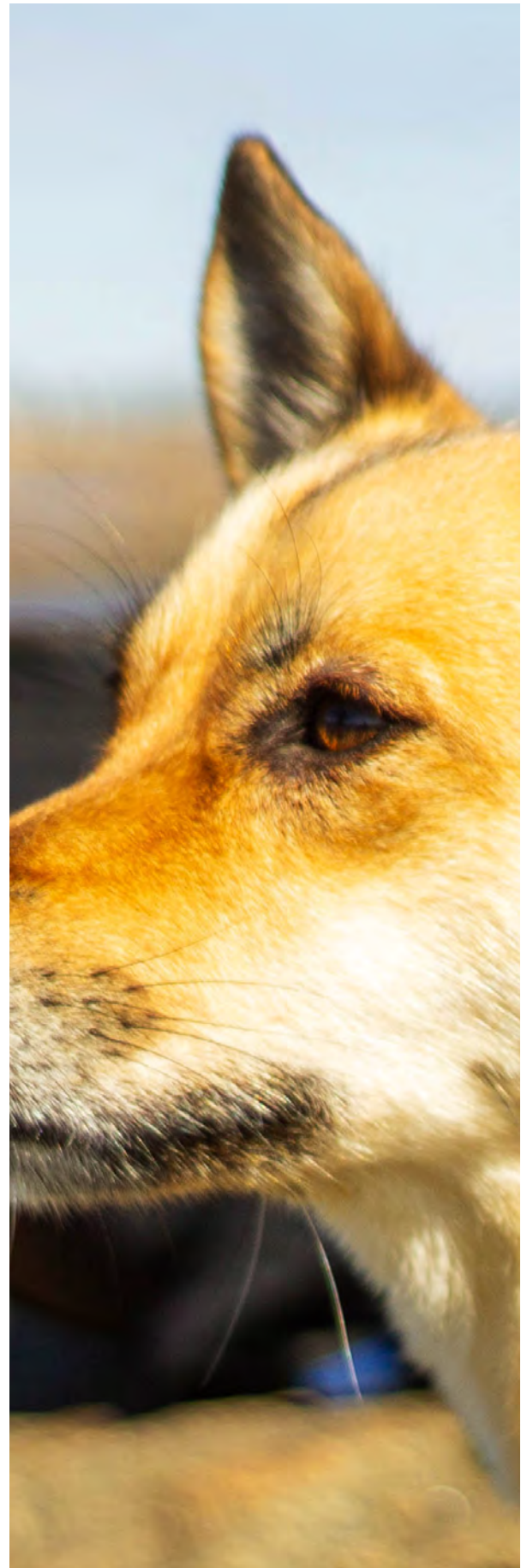
Phase 1: Identify the Opportunity (Complete) – Phase 1 includes a review of the project to understand if an opportunity exists, with a specific focus placed on developing an Inuit Rightsholder approach to project development. This stage also included a review of possible project configurations and high-level economics. What was critical here was evaluating the market and recognizing project strengths and weaknesses. The purpose of this phase was to confirm agreement among project partners and Inuit Rightsholders to proceed to a deeper level of evaluation.

Phase 2: Develop Alternatives (Current Phase) - Phase 2 focuses on further developing the business case and project plan. This includes generating and evaluating various viable development alternatives and some preliminary engineering work, including data collection and analysis. The purpose of this phase is to assess confidence in the project feasibility while considering the initial outcomes of the Tusaqtavut Study and any data collection campaigns, market assessments, and economics before proceeding. This phase includes ongoing Inuit Rightsholder engagement and community consultations/ stakeholder engagement all of which are critical to project success.

Phase 3: Front-End Engineering Design (“FEED”) and Market Evaluation - During this phase, project design and development of the preferred alternative is conducted, which will incorporate the findings and outcomes from the community. Engineering and cost estimates are refined to continue to understand economic and technical feasibility. Geotechnical and environmental baseline studies are key activities in this phase. The key outcome from this phase is coming to a decision on whether, and how, the project should proceed to execution. The Phase 3 decision-gate is arguably the most critical of all the phase-gate process, as it is the signing of the Final Investment Decision (“FID”) where the project funders are financially committing to the project.

Phase 4: Project Execution - Phase 4 is the construction phase of the project. Principles established in the earlier phases regarding IQ will be upheld throughout this Phase, and Iqalungmiut will continue to be informed of project activities and employment opportunities.

Phase 5: Asset Operation - Following the construction, start-up, and commissioning activities, capital projects are overturned to operations.



1.1 Key Phase 2 Activities & Highlights

Phase 2 is critical to the project’s overall success by creating substantial value and setting the precedent for future work. Phase 2 focuses on adequately defining the project, including an in-depth consideration of alternatives and their respective constraints, and engaging in meaningful dialogue and research with stakeholders and Rightsholders, to guarantee that the most valuable alternatives are generated and selected. This is demonstrated using the Eagle’s Beak graph, where a significant gap in value between well-defined and poorly defined projects is developed in phase 2. While the project’s value will continue to change through alternative development and project execution, the value creation in phase 2 is unparalleled and sets the overall path of the project.

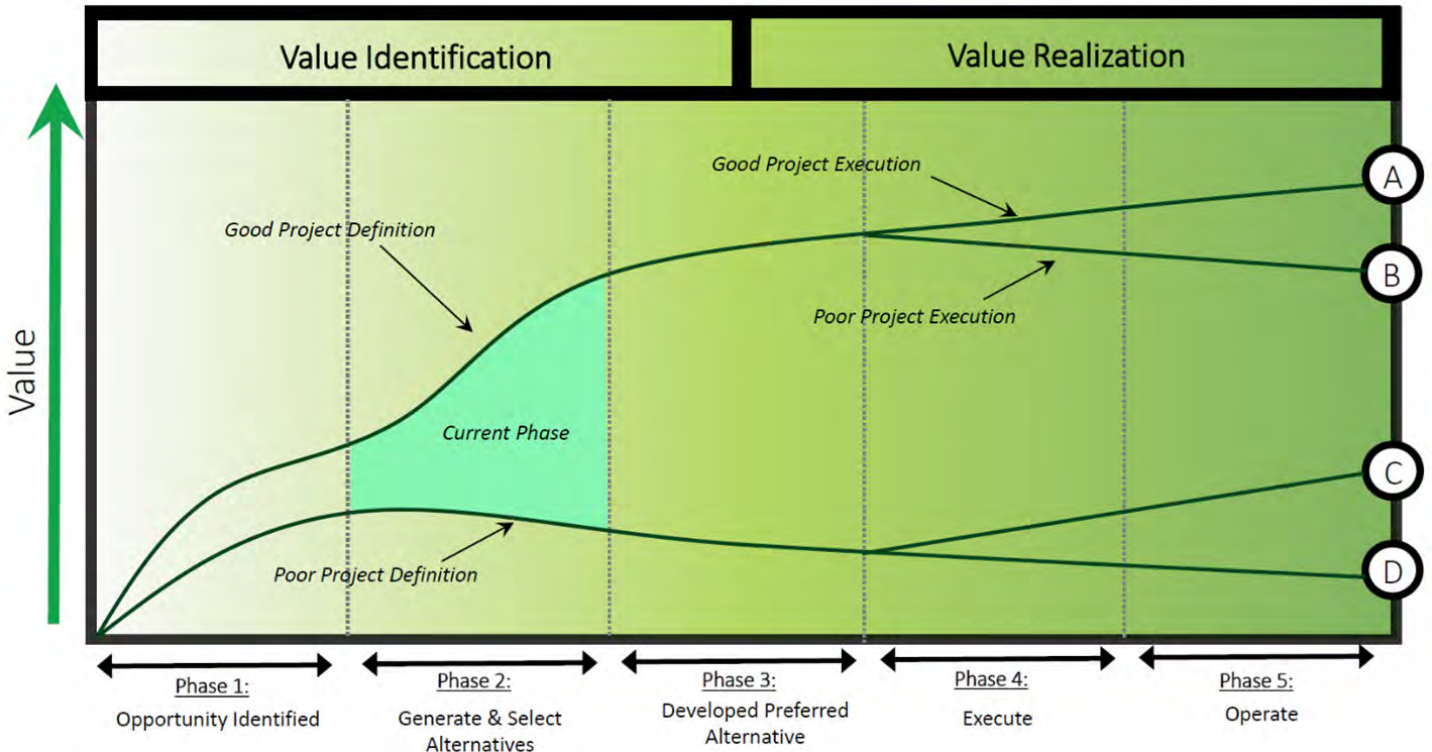


Figure 2 - Eagle’s Beak Diagram

Value, in terms of the *Iqaluit Nukkiksautiit Project*, can be defined using the Three-legged stool development approach. This approach considers three core aspects of value: social (community), environment, and economic. These three aspects are like the legs of a stool, which must be balanced for stability and success. Working with the three legs in parallel leads to good decision-making and project-building. Without all three, the project will fail.

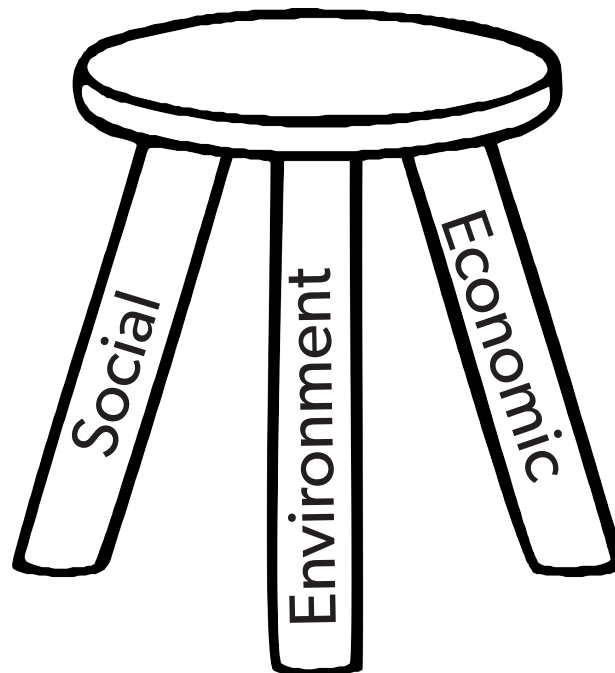


Figure 3 - Three - Legged Stool

Social Value: The social leg focuses on the project’s impact and benefits to the community and its people, prioritizing well-being, inclusivity, and free, prior, and informed consent. Work to date on this value includes the **Tusaqtavut Study** of Inuit values and land use mapped and overlaid in a Geographical Information System (“GIS”) mapping tool, community engagement planning and multiple community events hosted, and establishing an Inuit Advisory Committee to help advise project direction and community engagement strategy.

Environmental Value: The environmental leg considers the biophysical impact of the project, focusing on sustainability, conservation, and minimizing adverse effects on the ecosystem. Prioritizing renewable energy development helps eliminate the risks posed by carbon emissions and fossil fuel depletion. Environmental assessments are employed to carefully evaluate measures to reduce or mitigate the project’s biophysical footprint and to ensure compliance with the regulatory processes. Work to date on this Value includes the completion of a **Project Environmental & Regulatory Evaluation** detailing environmental constraints mapped and overlaid in a GIS mapping tool, and regulatory road mapping.

Economic Value: The economic leg focuses on the financial components of the project, including the techno-economic analysis, which assesses the technical feasibility and economic viability of a project. Work to date on this value includes the completion of the **Iqaluit Renewable Energy Alternatives Generation Report** detailing the identification of sites in the Iqaluit region, field visits, concept generation and ranking, continued financial modelling, and power and energy modelling to establish the levelized cost of energy for each site.

While there are a number of documents and files generated during Phase 2, the following table represents the key deliverables that contribute to the Phase 2 recommendation:

Deliverable	Document Number
1. Project Business Case, Including Bookend Economics	IQA-PMT-RP-005
2. Project Controls Plan (Phase 2)	IQA-PCO-RP-001
3. Project Plan for Phase 3	IQA-PMT-RP-006
4. Environment & Regulatory Review	IQA-HSE-RP-001
5. Tusaqtavut Study	IQA-COE-RP-001
6. Power & Energy Models - Alternatives	IQA-TDR-RP-001
7. Community & Stakeholder Engagement Plan	IQA-COE-RP-002
8. Alternatives Generation & Selection Report	IQA-TDG-RP-001
9. Phase 2 Decision Support Package, including updated Business Case and Project Economics	IQA-PMT-RP-007

Table 1 - Document Identification

During Phase 2, the Project Team must demonstrate to the Decision Maker that they have answered the following questions:

Has the Project Team considered a wide-range of doable alternatives?

Has the team completed the required analysis to recommend a preferred alternative?

Has the team received input, direction and consent from the community?

The document herein will summarize the analysis and recommendations from Phase 2 work and attempt to answer the key Phase 2 questions noted above.



Section 2
Community Profile:
Iqaluit

2.0 Community Overview

The city of Iqaluit is a community like no other in Nunavut. Formerly known as Frobisher Bay, Iqaluit is the largest municipality of Nunavut, the only city, and capital of the Canadian Territory. In Inuktitut, Iqaluit means 'place of many fishes', historically referring to the area's rich fishing grounds. This exciting and dynamic city is the political, business, journalistic and transport hub of Nunavut and has an excellent airport. The modern city of Iqaluit is rich in traditional Inuit culture. Home to many Inuk artists, filmmakers, and musicians, it hosts arts and culture festivals in the spring and summer that bring together artists from the region. Iqaluit is home to the Territory's main government offices. Nunavut's main hospital is in Iqaluit, as is the Nunavut Arctic College main campus, and the Legislative Assembly of the Territorial Government of Nunavut. Residential subdivisions are spread around Iqaluit.



7,429 Total Population

58.5% Inuit Population



42% Inuktitut Speaking



32.6 Median Age

19% Population with
Highschool Diploma

(Stats Canada & QIA)

Employment

The major employers in Nunavut are Inuit organizations and the Territorial government, with oil, gas and mineral exploration, arts and crafts, hunting, fishing, tourism, and transportation providing opportunities for employment.

Housing

- Total Private Dwellings: 3297 (Stats Canada, 2021)
- Total Occupied Private Dwellings: 2710 (Stats Canada, 2021)
- Population density per square km: 144 (Stats Canada, 2021)
- Land area in square km: 51.58 (Stats Canada, 2021)

Transportation

With no roads connecting to southern Canada, Nunavut's communities are only accessible by air or sea. Some of the main means of passenger transportation are:

- Canadian North
- Iqaluit Taxi Service
- ATV/Snowmobile

Electrical system capacity

Qulliq Energy Corporation ("QEC") is a Territorial corporation wholly owned by the Government of Nunavut ("GN"). QEC delivers electricity to approximately 15,000 customers across Nunavut. QEC generates and distributes power to Nunavummiut through the operation of 25 stand-alone diesel power plants in 25 communities, with a total installed capacity of approximately 76 MW. The corporation's business activities are maintained at the head office located in Baker Lake and corporate offices in Iqaluit. Annual demand in the community is around 55 GWh. There are approximately 800 customers in Iqaluit alone. Total load of around 60 GWh is generated annually, while around 50 GWh is sold.

2.1 Physical Setting

The city of Iqaluit is located on Baffin Island at the northern end of Frobisher Bay near the mouth of the Iqaluit Kuunga. Iqaluit is located near beautiful parklands that feature a range of landscapes, mountains, rivers, waterfalls, and ancient Thule sites to visit. Iqaluit is at the head of a large tidal basin, Frobisher Bay, or 'Tasiujarjuaq' in Inuktitut, and is situated on the shores of Koojesse Inlet. Dramatic tides create long stretches of rocky beaches and mud flats along the inlet. Freeze-up of Frobisher Bay generally occurs in November and lasts until June.

Location

Longitude 68° 31' W

Latitude 63° 45' N

Elevation 34m

Area: 52km²

Climate

In late June and early July, the city experiences nearly 24 hours of sunshine, with stunning twilight skies for two hours right before midnight. December's shortest days feature four hours of daylight and the sun is positioned just over the southern horizon. From October to April, northern lights are commonly sighted. Wintertime lows of -10 to -32 degrees Celsius are common. In Iqaluit, the summers are cold and mostly cloudy, and the winters are frigid, snowy, windy, and overcast. Based on the tourism score, the best time of year to visit Iqaluit for warm-weather activities is from mid July to early August. (weatherspark.com)



Weather Conditions

Average Temperature

From June 10th to September 16th is the warm season, that has 3.2 months of days with highs above 5 °C on average. In Iqaluit, July is the hottest month of the year, with an average high of 12 °C and low of 5 °C.

The average daily high temperature during the 3.3-month long cold season, which runs from December 15th to March 24th, is below -16 °C. With an average low of -30 °C and a high of -23 °C, February is the coldest month of the year in Iqaluit.

Clouds

The average proportion of sky covered by clouds in Iqaluit varies significantly seasonally throughout the year. Iqaluit's clearer season starts about April 10th and lasts for 3.5 months, wrapping up around July 28th. May is the clearest month of the year in Iqaluit, with the sky remaining clear, mostly clear, or partly cloudy 45% of the time on average. Around July 28th marks the start of the year's cloudiest period, which lasts for 8.4 months and ends around April 10th. Iqaluit experiences its cloudiest month of the year in January, when the sky is typically overcast or largely cloudy 75% of the time.

Rainfall

The monthly rainfall in Iqaluit varies significantly by season. From May 22nd to October 22nd there are 5.0 months of rain, with a typical 31-day rainfall of at least 13 millimetres. With an average rainfall of 58 millimetres, August is the month with the most rain in Iqaluit. From October 22nd to May 22nd there are 7.0 months without a drop of rain. Iqaluit experiences zero millimetres of rain on average in February, the month with the least amount of precipitation.

Snowfall

The annual snow cover period lasts 9.0 months from September 16th to June 16th, with a sliding 31-day time window of at least 1 inch of snowfall. The snowiest month in Iqaluit is April, with an average snowfall of 161 mm. The annual snow-free period is 3.0 months from June 16th to September 16th. The lightest snowfall occurs around July 28th, with an average total snowfall of 0.0 inches.

Wind

The winds that occur at any given location are highly dependent on the local topography and other factors, with instantaneous windspeed and direction varying more than the hourly average. In Iqaluit, the wind speeds experience some seasonal variation throughout the year. The windiest season of the year lasts for 8.8 months, from September 14th to June 8th, with average wind speeds exceeding 25.9 kilometer per hour. The windiest month in Iqaluit is October, with an average wind speed of 18.3 kilometers per hour. The milder period of the year lasts for 3.2 months from June 8th to September 14th. The coldest month in Iqaluit is July, with an average wind speed of 15.5 kilometers per hour.

Geomorphology

Iqaluit is situated on gently rolling hills, with rocky outcrops and lush tundra valleys. The tides of Frobisher Bay at Iqaluit rise and fall eight to twelve metres (26-39 feet) twice a day — the second highest tides in Canada after the Bay of Fundy in Nova Scotia. (Travel Nunavut)

2.2 Community Demand Profile

Iqaluit’s community demand profile, considered when developing renewable energy alternatives, includes two load scenarios:

1. Base Load Scenario: The base load scenario captures the current community electrical load. This case assumes that load growth continues at the current rate.

2. Future Demand Scenario: The second load case is intended to capture the total potential electric load for the community. This load case includes the current electrical load, the current thermal load (converted to electricity) and a hypothetical load by an industrial off-taker.

Currently, the City of Iqaluit’s electrical energy demand is met entirely by diesel generation. Six diesel generators ranging from a 2.0 to 5.0 MW capacity are operated by QEC, providing a total capacity of close to 25 MW and an installed capacity of 17.6 MW, where the possibility of the largest generator being out of service is considered. Iqaluit’s thermal energy is supplied by oil heaters, where each home is equipped with an oil storage tank and heating oil is delivered by truck several times a year. The electrical and thermal loads characterized were developed using data provided by QEC as the basis, with gaps in the data generated synthetically. Industrial demand was generated theoretically based on experience and consultation with the project stakeholders.

Load	Max Power (MW)	Average Power (MW)	Min Power (MW)	Energy (GWh/yr)	Percent
Electrical	10	8	6	6	25%
Thermal	42	16	2	140	60%
Industrial	6	4	0	30	15%
Coincident Demand	52	28	8	235	100%

Table 2: Iqaluit Load Characterization Summary

This report investigates alternatives to displace Iqaluit’s electrical load, currently evaluated at 10 MW and 65 GWh annually, with renewable sources. Additionally, it prioritizes potential expansions to support industrial off-takers and the conversion of the thermal load from oil heaters to electric heat pumps. It is assumed that an Independent Power Producer (“IPP”) is paid only for the energy sold and that existing or new diesel generators are shut off when demand is met by a lower-cost energy supply.

2.3 Rightsholder & Stakeholder Profiles

2.3.1 Inuit Organizations

As per the Constitution Act of 1982, the GC recognizes and affirms the existing aboriginal and treaty rights of the aboriginal peoples of Canada, which includes Rights that may be acquired by way of land claims agreements (Department of Justice Canada 2022). In 1992, Inuit of the Nunavut Settlement Area, represented by the Tunngavik Federation of Nunavut, now known as Nunavut Tunngavik Incorporated (NTI), voted to approve the Nunavut Land Claims Agreement (“NLCA”) with Her Majesty the Queen in Right of Canada (Nunavut Tunngavik Inc.; Indian and Northern Affairs Canada 2010). The objectives of the NLCA are as follows:

- To provide for certainty and clarity of Rights to ownership and use of lands and resources, and of Rights for Inuit to participate in decision-making concerning the use, management and conservation of land, water and resources, including the offshore;
- To provide Inuit with wildlife harvesting Rights and Rights to participate in decision-making concerning wildlife harvesting;
- To provide Inuit with financial compensation and means of participating in economic opportunities;
- To encourage self-reliance and the cultural and social well-being of Inuit;

There is a wide range of Articles within the NLCA that define how these objectives are pursued and upheld for the Rightsholders and beneficiaries of the NLCA—Nunavummiut. Of particular significance, the NLCA defines and dedicates 356,000 km² (17.7% of the territory’s landmass) as IOL; and, through the Nunavut Trust, committed ~\$1.12 billion (over 17 years) in Settlement Payments (Nunavut Trust n.d.).

NTI is the overarching Inuit Organization that holds a mandate to speak for all Nunavummiut with respect to the rights and benefits of Inuit under the NLCA (Government of Nunavut; Nunavut Tunngavik Incorporated 2011). As such, NTI ensures that promises made under the NLCA are carried out, by coordinating and managing Inuit responsibilities and holding the federal and territorial governments accountable to fulfill their obligations (Nunavut Tunngavik Incorporated n.d.).

NTI designates the responsibility of managing IOL to three regional Designated Inuit Organization (“DIO”) each of which have their own for-profit development corporations, or Regional Inuit Birthright Development Corporations (“RDC”), that are tasked with developing sustainable wealth, Inuit participation in decision-making and economic opportunities, Inuit self-reliance, and cultural and social well-being. These RDCs own a multitude of subsidiary businesses with targeted mandates within fisheries, transportation, telecommunication, hospitality, energy, environment, construction, retail, and real estate (Qikiqtaaluk Corporation n.d.)

Region	Designated Inuit Organization	Regional Inuit Birthright Development Corporation
Kitikmeot	Kitikmeot Inuit Association	Kitikmeot Corporation
Kivalliq	Kivalliq Inuit Association	Sakku Investments Corporation
Qikiqtani	Qikiqtani Inuit Association	Qikiqtaaluk Corporation

Table 3 - Organization by Region

For the context of this project, the voices of Iqalungmiut are represented in the Tusaqtavut Study, in the community engagement activities and reporting, and in ranked ballots cast to select a preferred alternative.

It is essential that that any and all Renewable Energy (“RE”) and/or infrastructure developments respect and preserve the legislated rights of all Nunavummiut, as represented by their DIOs. Developments should proceed only with the consent of Rightsholders; i.e. if and when the Rights of Nunavummiut, as determined by Iqalungmiut, the DIOs, NTI, and the NLCA, are not negatively impacted and permission to move forward on projects situated on IOL is explicitly provided by the relevant DIO.

2.3.2 The Government of Nunavut

The GN and NTI uphold a mutually beneficial working relationship to improve the lives of Inuit and to help Nunavut realize its potential as a healthy, prosperous, and secure territory within Canada (Government of Nunavut; Nunavut Tunngavik Incorporated 2011). The Clyde River Protocol (1999), Iqqanaijaqatigiit (2004), Aajiiqatingiinniq (2011), and Katujjiqatigiinniq (2017) are all iterative protocols jointly signed by NTI and the GN to define their commitment to working together. In the most current version of the agreement, which was signed in January, 2020 (Nunavut Tunngavik Incorporated; Government of Nunavut 2020), both NTI and GN recognize:

- Inuit constitute 85% of the population of Nunavut and have constitutionally protected rights under the NLCA;
- NTI holds the mandate to advocate for and speak on behalf of Nunavut Inuit with respect to their aboriginal and treaty rights and benefits under the NLCA;
- The GN, in exercising its jurisdiction as a democratic and responsible public government must serve the needs and priorities of all citizens of Nunavut, in a fair and equitable manner.
- There are three joint priorities in the protocol: (1) Mobilize Inuit Identity and Culture, (2) Foster Quality of Life and Well-Being for Inuit, and (3) Develop, Monitor, and Renew Policies, Programs, Services and Legislation. The ways in which these three themes are to be actioned are defined in detail, but of relevance to this Project are the following:
 - “Support the spirit of the United Nations Declaration on the Rights of Indigenous Peoples and its potential application in Nunavut.”
 - “Establish strategic partnerships for major infrastructure projects in Nunavut with all levels of government and private sector including foreign investors.”
 - “Advance Inuit goals and objectives through research and consultation.”

For the context of this project, NNC and any affiliated contributing parties will be working side by side with Inuit Rightsholders in community, where Inuit Societal Values (“ISV”) and true collaborative decision-making form the basis of all work that will be done. This puts power in the hands of Iqalungmiut to determine if and when the Project is serving their needs, priorities, and goals; and, upholding their Rights.

The GN is not a Rightsholder, but it is a key stakeholder that holds significant regulatory agency. The GN holds obligations to Nunavummiut through the Katujjiqatigiinniq Protocol with NTI, and as such, the approach this Project takes will empower Rightsholders to communicate with the GN and advocate for its participation in (and efforts to remove any barriers to) the advancement of any recommendations from this Project approved by Rightsholders.

2.3.3 Hunters and Trappers Associations

Similar to the three regional DIOs, there are three Regional Wildlife Organizations (“RWO”). These RWOs manage harvesting among Hunters and Trappers Associations (“HTA”) within their respective regions (Nunavut Tunngavik Incorporated n.d.). The Nunavut Inuit Wildlife Secretariat (“NIWS”) provides support to the RWOs and HTOs. Article 5 of the NLCA recognizes, subject to availability as determined by the application of the principles of conservation, the legal rights of Inuit to harvest wildlife flow from their traditional and current use to meet their basic needs (Nunavut Tunngavik Inc.; Indian and Northern Affairs Canada 2010). In the case that total allowable harvest limits for wildlife stocks have not been set, an Inuk shall have the right to harvest that stock to the full level of their economic, social, and cultural needs.

It is essential that any and all RE and/or infrastructure developments respect and preserve the legislated hunting and trapping rights of all Nunavummiut, as represented by their HTAs. Developments should proceed only with the consent of Rightsholders; i.e. if and when Nunavummiut’s Rights to harvest, as determined by the HTAs and the NLCA, are not negatively impacted and permission to move forward is explicitly provided by the HTAs.

2.3.4 Municipal Governments

Nunavut municipalities, i.e. Hamlets and the City of Iqaluit, hold the responsibility to develop municipal plans which include regulations around land use and development that apply to IOL. Article 11 of the NLCA outlines how municipalities must go about land use planning with respect to the Rights of Inuit Rightsholders. The Article applies to both land and marine areas with the Nunavut Settlement area, and “land” includes freshwater and resources including wildlife (Nunavut Tunngavik Inc.; Indian and Northern Affairs Canada 2010).

As Municipal Governments have the power to administer and amend land use regulations within municipal boundaries on behalf of Inuit Rightsholders, it is essential that any and all RE and/or infrastructure (i.e. roads) developments on municipal land respect and preserve the legislated land use rights of all Nunavummiut, as represented by their Municipal Governments – in this case, Iqaluit City Council. While the Kuugaluk site is not situated on municipal lands, and therefore does not require municipal approvals, Iqaluit City Council is a key stakeholder – they must be kept informed and given space to provide input into the project development process.

2.3.5 Inuit Tapiriit Kanatami

Inuit Tapiriit Kanatami (“ITK”) is the National representational organization protecting and advancing the Rights and interests of Inuit in Canada. It represents 65,000 Inuit in Canada, and produces advice, knowledge, strategies, action plans, policy tools and learning resources to protect and advance the rights and interests of Inuit in Canada (Inuit Tapiriit Kanatami 2022).

The ITK reports that Inuit have historically been excluded from government conversations and policy on climate action, and part of Reconciliation is acknowledging Inuit as leaders in pushing forward climate action (Inuit Tapiriit Kanatami 2022). They look to the positive action achieved by off-grid Alaskan and Greenlandic communities, while acknowledging that energy policy in Canada is different and requires the GC to work closely with Inuit to achieve energy transitions that benefit communities.

“Inuit are Rights holders and any climate action should apply a Rights-based approach premised on partnerships with representatives of Inuit and governments.”

- ITK Climate Policy

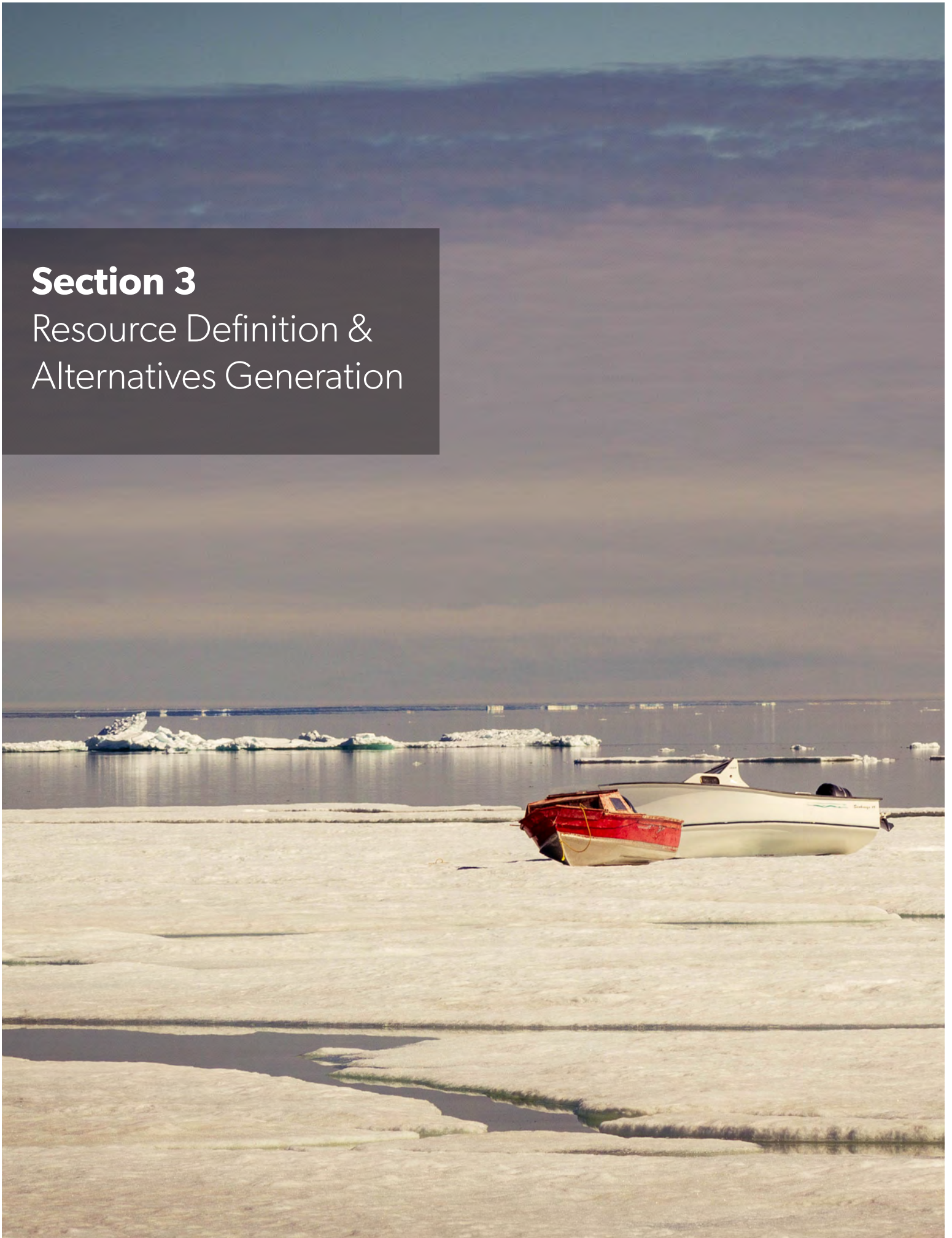
ITK have developed a National Inuit Climate Change Strategy with five priority areas, one of which is energy. The strategy “supports regional and community-driven energy solutions leading to Inuit energy independence” (Inuit Tapiriit Kanatami 2019). The long-term outcome that ITK strives for in this area is for reliable, sustainable and affordable energy systems to be in place in all Inuit communities.

ITK states its intention, on behalf of Inuit Rightsholders, to work in partnership with governments to create policy environments where diesel fuel subsidies can be responsibly and strategically reinvested (Inuit Tapiriit Kanatami 2019) to include alternative energy mixes and cleaner technology. It commits to defining pathways to increase Inuit ownership and governance of energy systems.

This project looks to the goals objectives, actions, and guiding principles of the National Inuit Climate Change Strategy to ensure that all work being undertaken is in alignment with the Rights of Inuit at the national level.

Section 3

Resource Definition & Alternatives Generation



3.0 Renewable Resources Around Iqaluit

Project site investigation explored the most attractive renewable energy development alternatives that the natural resources of the area have to offer to the beneficial use of its people, regardless of land ownership boundaries. In the early stages of the review, small nuclear reactors (“SMR”), solar, and tidal energy were also considered, but were eliminated in favour of hydro and wind resource potential due to poor commercial viability (in the case of SMRs and tidal), or inability to meet the technical or economic requirements set out by the project team (in the case of solar). In previous studies on identifying hydroelectric potential in the Iqaluit region, several sites were highlighted and characterized. As part of this current study, the team completed an independent assessment of these known sites, as well as a thorough regional survey and assessment for other potential renewable energy sites via desktop review. Several new project alternatives, and several alternate configurations for previously identified sites, were developed and are included in this study.

An outer bound of 200 km from the City of Iqaluit was used as a benchmark for investigation of alternatives. Beyond this range, developments are unlikely to be economically viable due to the high costs of long-distance transmission.

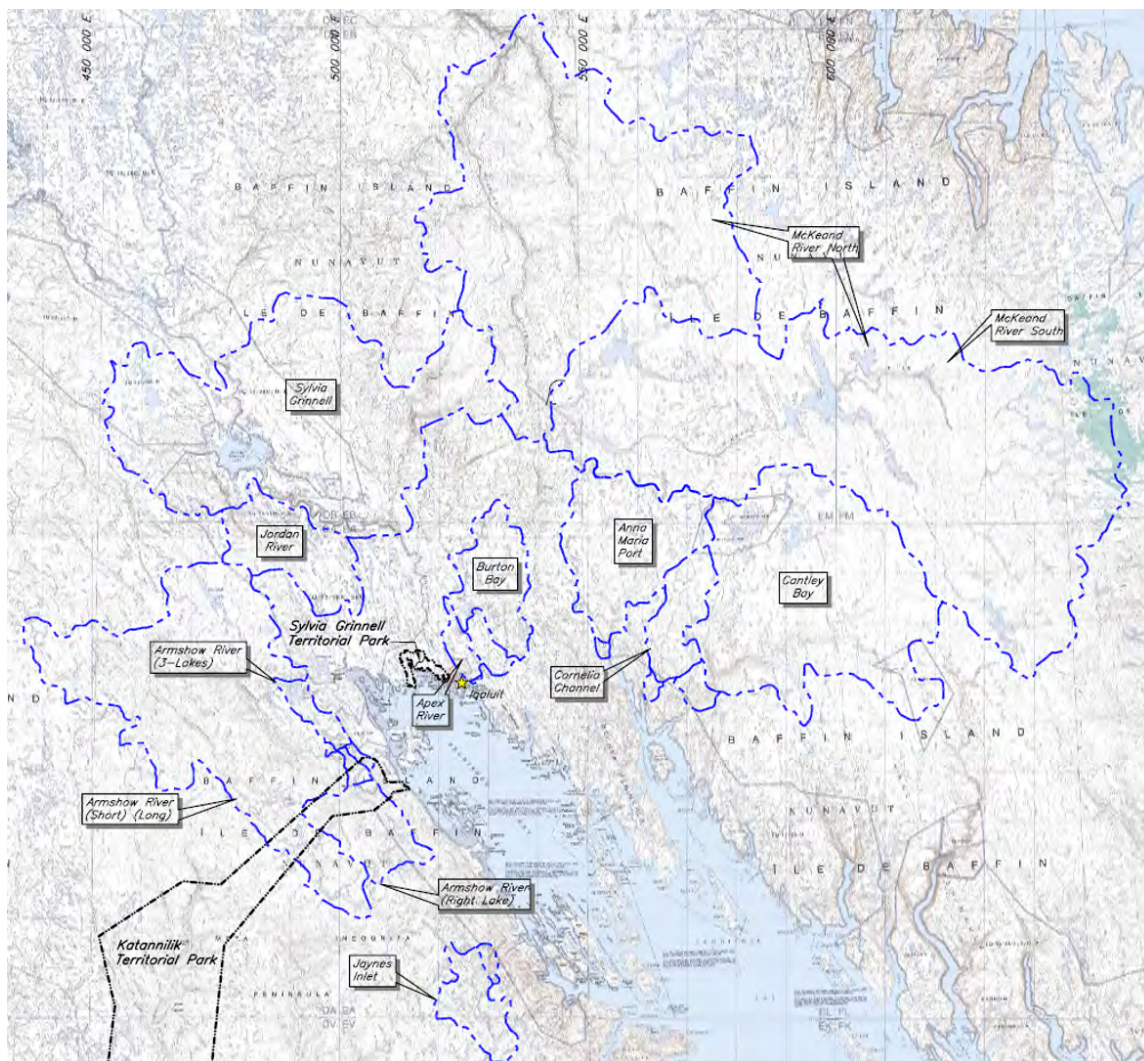


Figure 4 - Water Catchment Areas surrounding Iqaluit

3.1 Site Conditions

3.1.1 Terrain

The Government of Canada High Resolution Digital Elevation Model (“HRDEM”), derived from airborne LiDAR and satellite data, was used to characterize the terrain for this assessment. This data has sufficient accuracy and precision for the purpose of this phase of the work.

3.1.2 Hydrology

There are many freshwater lakes and rivers located around Frobisher Bay, several of which are suitable locations for hydroelectric power facilities. All waterbodies in the area are seasonally covered by ice, and rivers flow without ice cover from about mid-May to December. Hydrographs are generally characterized by a significant peak during June and July, which coincides with the spring freshet. Flows steadily decrease from early summer until rivers become ice covered in December when the rivers’ lowest flow occurs until mid-May. The Water Survey of Canada (“WSC”) has established hydrometric stations at several potential hydroelectric power sites. Extensive hydrological analyses, previously carried out by Knight Piésold (“KP”), culminated in the development of synthetic flow series for these station locations. However, KP based its work on data records of only one year in length.

The WSC has since collected more data at these same locations over a period of 5-7 years, that greatly improves the quality and confidence of the river flow data set. Building on the work completed by KP, the project team developed long-term synthetic flow series to use as input for the assessment power and energy modeling. Specifically, data from the hydrometric station on the Iqaluit Kuunga (10UH001), along with data from the hydrometric stations at some of the potential hydroelectric power sites, namely those that were previously studied by QEC, were used to produce these long-term flow series.

3.1.3 Wind Resource

Eastern Nunavut possesses a substantial wind resource. Dominated by strong polar easterlies and influenced by topography, its coastal and elevated regions experience consistent and potent winds year-round. These consistent winds make it a promising area for harnessing wind energy, with the potential to support sustainable power generation. Data from the Canadian Wind Atlas was used as inputs for the power and energy modeling. For context, average annual wind speeds of 6.5 m/s or greater at 80 m above ground are generally considered commercially viable for wind energy (Center for Sustainable Systems, University of Michigan, 2022). For context, Iqaluit’s mean annual average wind speed is approximately 8.5 m/s based on findings of the current study.

3.1.4 Geology

The geology throughout the area was mapped at 1:5,000,000 by the Geological Survey of Canada and published in 1996. Limited in-depth research has been done in the area. Digital maps were obtained from the FTP Maps Canada website (NRCan Website). The files were downloaded as 2 m polar-stereo geo-tiff files. The files were used to obtain topography, slope angles, slope directions, cross section profiles, and were used for large scale terrain assessment.

3.1.5 Oceanography

Except for the Kuugaluk River site, the hydroelectric power alternatives included in this assessment are located on rivers that discharge to Frobisher Bay. The chemical and physical characteristics of these waters are influenced by freshwater rivers, as well as sea water from the North Atlantic Ocean. Frobisher Bay is seasonally covered by ice which forms in early December and breaks up in mid-June. In addition to temperature changes, strong winds influence the forming and breakup of sea ice. The deepest parts of Frobisher Bay exceed 300 metres.

3.2 Wind and Water Sites Identified

Based on the regional study data, 16 development alternatives were identified and developed for evaluation and ranking. These sites included:

- 1.** Conventional Hydro options
- 2.** Wind Options
- 3.** Conventional Hydro + Wind Options
- 4.** Pumped Storage Hydro Options

The following page highlights the locations of each of the 16 alternatives around Frobisher Bay. These 16 alternatives will be the subject of evaluation in the subsequent sections herein.



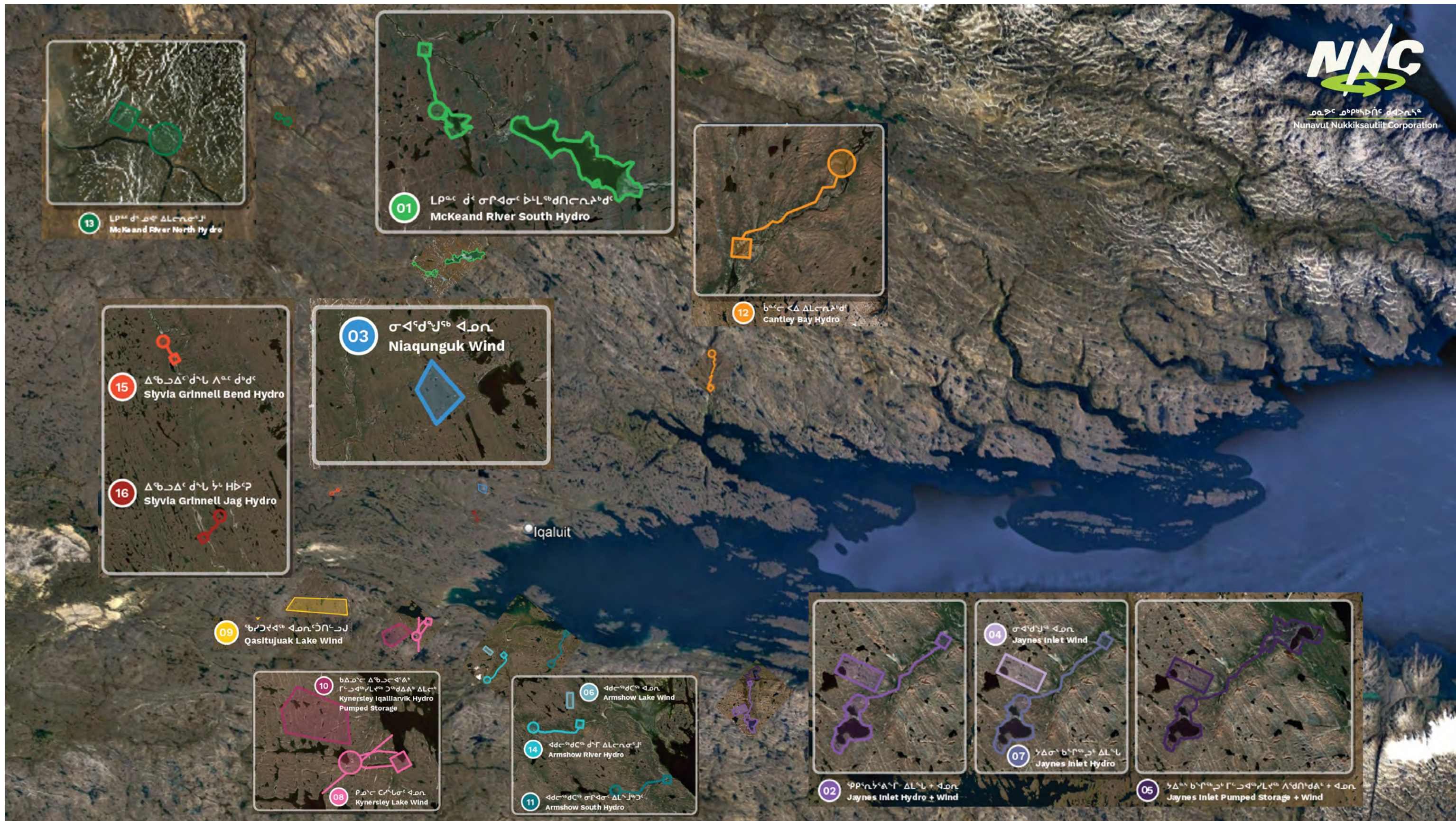
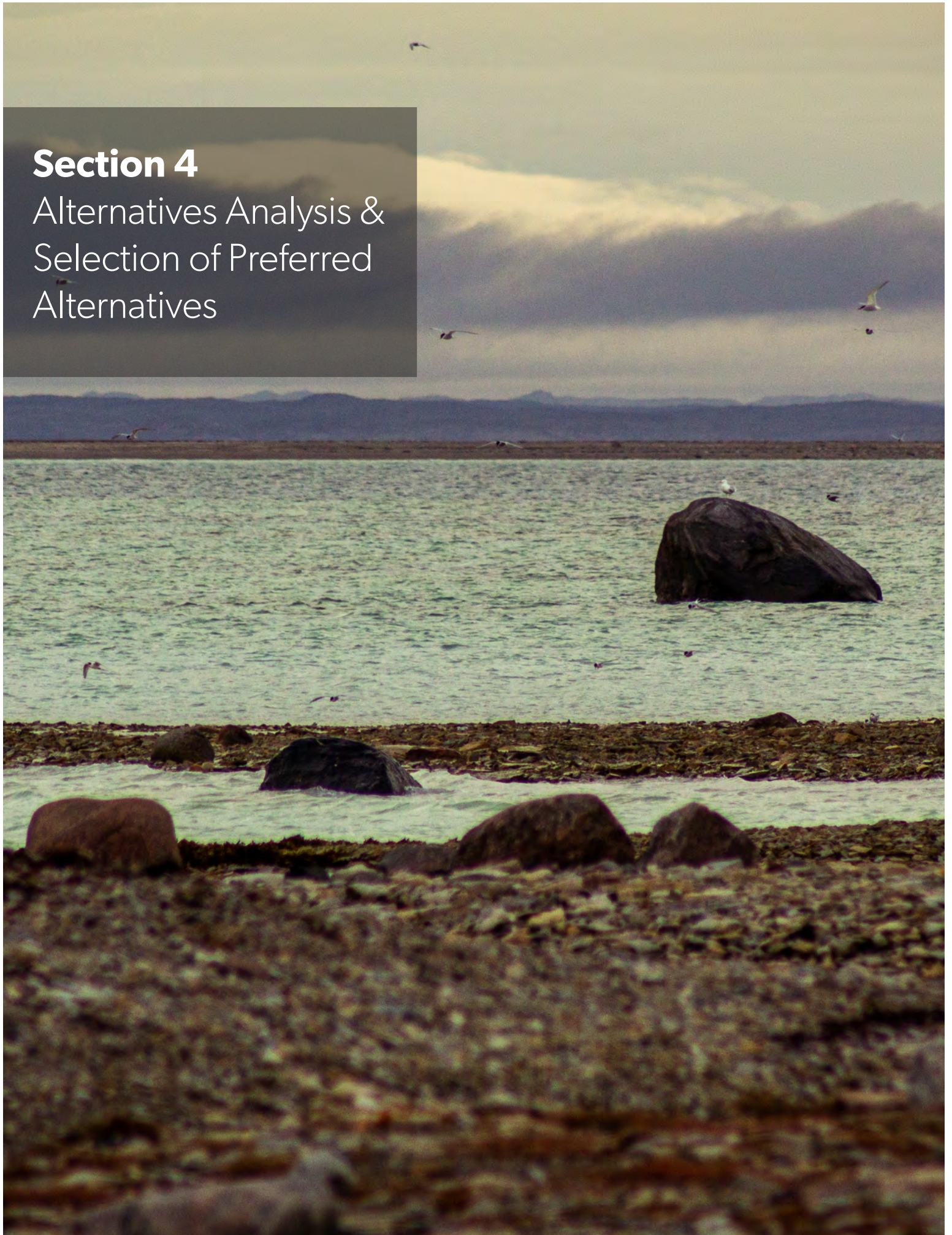


Figure 5 - Alternatives' Location

Section 4

Alternatives Analysis & Selection of Preferred Alternatives



4.0 Project Framing

The *Iqaluit Nukkiksautiit Project* focuses on the needs of the city of Iqaluit; in other words, the alternatives generated, evaluated and ranked were based on long-term community requirements ONLY. Other opportunities, such as proximity to mining operations or future industrial loads, will be evaluated in Phase 3.

The following graph illustrates elements considered for the project, and whether those elements are 'in/out of scope' for the project. Items considered on the boundary are not yet decided on and will be revisited in future phases of the project to decide whether to move it 'in' or 'out'.

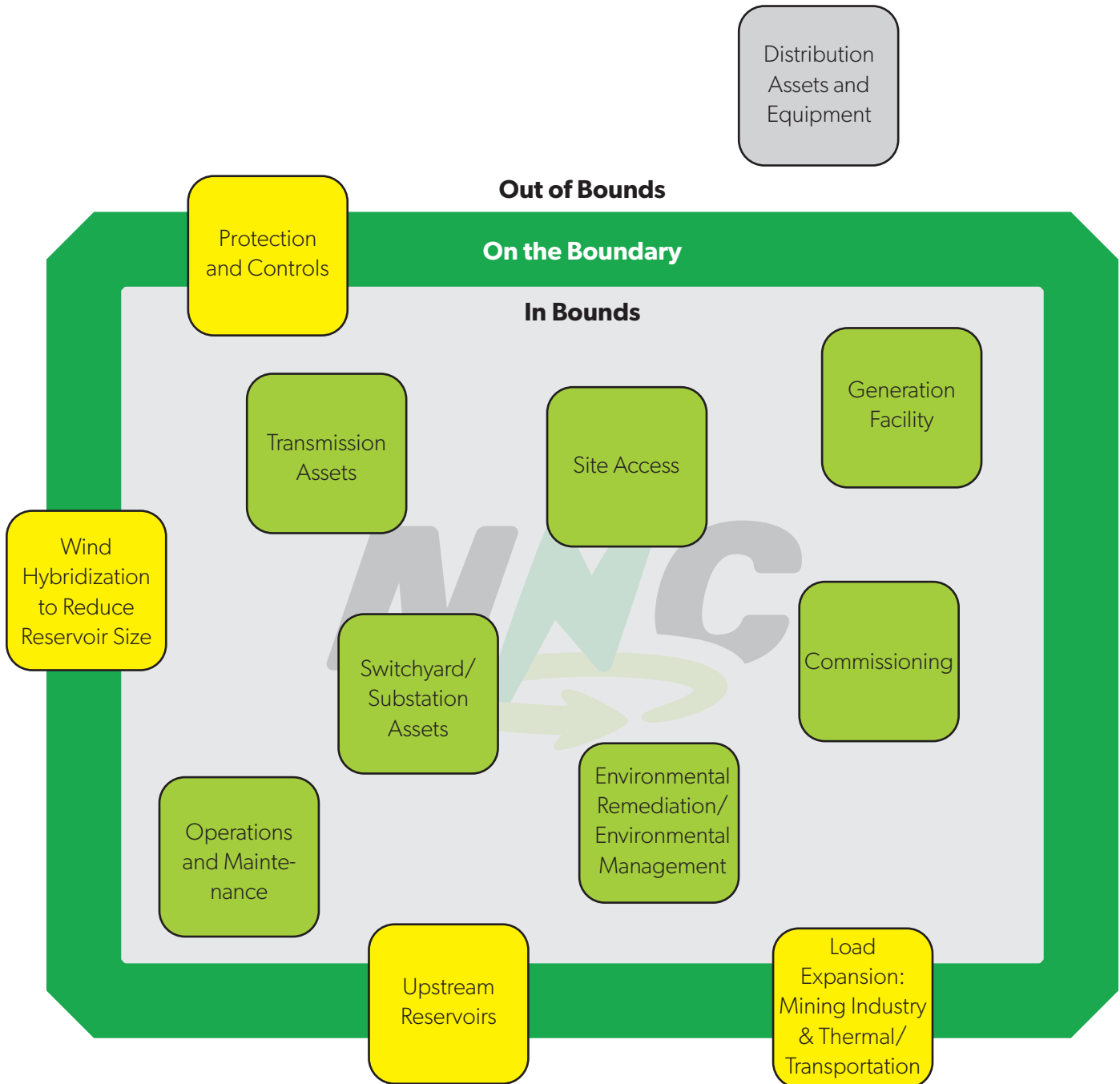


Figure 6 - Project Frame

Project Boundaries	In Bounds	Out of Bounds	On the Boundary	Rationale: Why it should be in	Rationale: Why it should be out
Transmission Assets	x			There will be a requirement to interconnect to Iqaluit's existing grid	
Generation Facility	x			Water power and wind power facilities will be the core asset in this project	
Site Access	x			Dedicated access will be required for construction and O&M activities	
Distribution Assets and Equipment		x			It is assumed that power will be sold to QEC for distribution
Switchyard/Substation Assets	x			Necessary for grid integration (upgrade to QEC switchyard) and switchyard at generation facility	
Protection and Controls			x	There will be some P&C involved with facility integration; boundary TBD	NNC may want to 'own' the integration in to the grid from a software perspective
Load Expansion: Mining Industry			x	The economic benefit and system stability of a larger load	Shorter/unpredictable timelines for mining developments
Commissioning	x			Needs to be commissioned before integration to QEC's equipment	
Operations and Maintenance	x			Needs to be considered from perspective of economics and community benefits	
Environmental Remediation/ Environmental Management	x			May need to mitigate issues raised during environmental assessment process	
Load Expansion: Thermal and Transportation			x	Fossil fuel will be highly volatile over a 40 year period and is not a long term solution	It would be significant up front investment with no certainty of when heating/transportation fuels will phase out
Capacity expansion using wind and upstream storage			x	Higher output to accommodate community growth	Poses cost/economic risk in early years of development

Table 4 - Project Boundaries

4.1 Analysis Philosophy

To evaluate the proposed renewable energy alternatives, the three-legged stool development approach was employed, assessing the social, environmental, and economic factors of each option to determine overall value and select the optimal alternative to advance to the subsequent project phase. The evaluation of the alternatives was supported by information sourced from three primary inputs, each representing different aspects of the three-legged stool: The Tusaqtavut Study, the Environmental & Regulator Evaluation, and the Iqaluit Renewable Energy Alternatives Generation Report.

4.1.1 The Tusaqtavut Study

The Tusaqtavut study was undertaken, under the leadership and guidance of QIA, to understand and map the Inuit land use of Southern Baffin Island. QIA's Tusaqtavut study, supported by Firelight Research Inc., presents the results of community scoping meetings, focus groups, and up to 80 Inuit Qaujimagatuqangit ("IQ") mapping interviews with knowledge holders in Iqaluit. This study was conducted before technical concept generation, ensuring the project was driven by Inuit land use, not vice-versa.

The land use and cultural activities throughout the lands and waters of Frobisher Bay and the South Baffin Area were described for five critical values to Iqalungmiut:

- Marine Harvesting
- Terrestrial Harvesting
- Fishing and Freshwater
- Travels, Trails, and Habitation
- Cultural Continuity

Data was collected on past values passed down through intergenerational knowledge transfer, current values within living memory, and future values referring to anticipated or intended land uses. Interviews were transcribed in the report detailing specific Inuit values and land use practices, including hunting and fishing journeys for food and production of goods, community sharing of harvested food, harvesting birds and eggs, collecting plants and berries, collecting clean freshwater, trails for traveling and recreational activity, knowledge transmission, outpost camps with ancestral connections, and other connections to the land.

Site-specific data were gathered as interviewees were asked to mark areas of reported use and value. In total, there were 1287 reported site-specific values within the study area. It has been noted that any absence of data does not imply a lack of value, as not all Iqaluit elders, land users, and knowledge holders could participate in the study.

Key Value	Within Areas of Interest	Within the Study Area
	# of reported values	# of reported values
Cultural Continuity	13	64
Fishing and Freshwater	111	283
Marine Harvesting	34	323
Terrestrial Harvesting	92	351
Travel, Trails, and Habitation	65	266
Total	315	1287

Table 5: Iqaluit site-specific use values, by key value reported within the Study Area and Areas of Interest

Of the reported site-specific values within the study area, 315 are within the areas of interest established by NNC, and the number of site-specific values in each area of interest can be seen below.

Area of Interest	# of Reported Values
Kuugaluk River	0
Kuugaluk-Kangala Basins	6
Cantley Bay	29
Qigirrijaarvik	49
Armshow River/Armshow South (Lake)	101
Wind Development Sites	7
Pumped Storage Hydro	16
Kangala Transmission	32
Qigirrijaarvik (Jayne's Inlet) Transmission	18
Qigirrijaarvik/Armshow Transmissions	95
Iqaluit Kuunga	51

Table 6: Iqaluit site-specific use values, by Areas of Interest

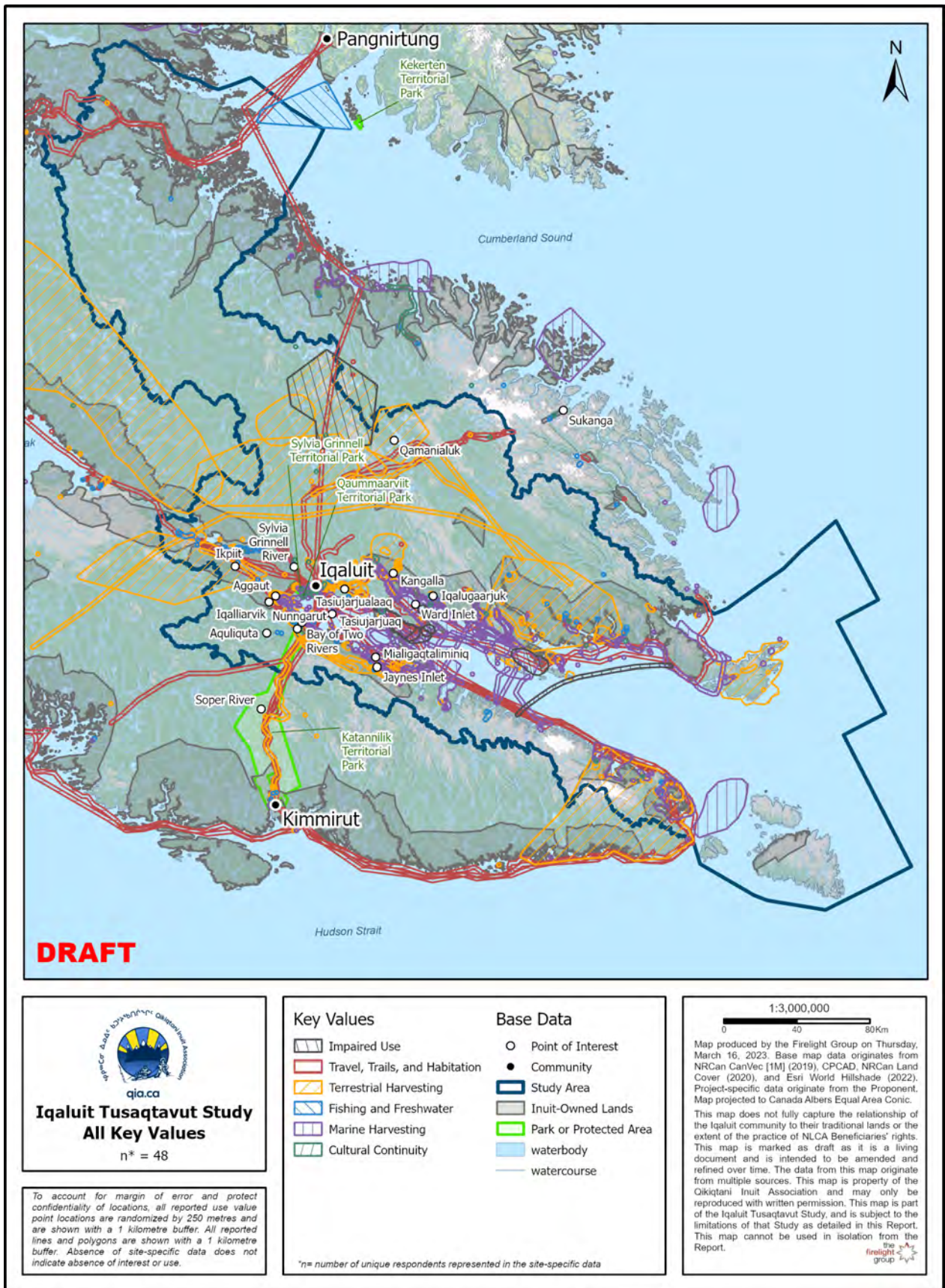


Figure 7: Iqaluit reported site-specific values, and their associated areas, within the Study Area for NNC's potential renewable energy development

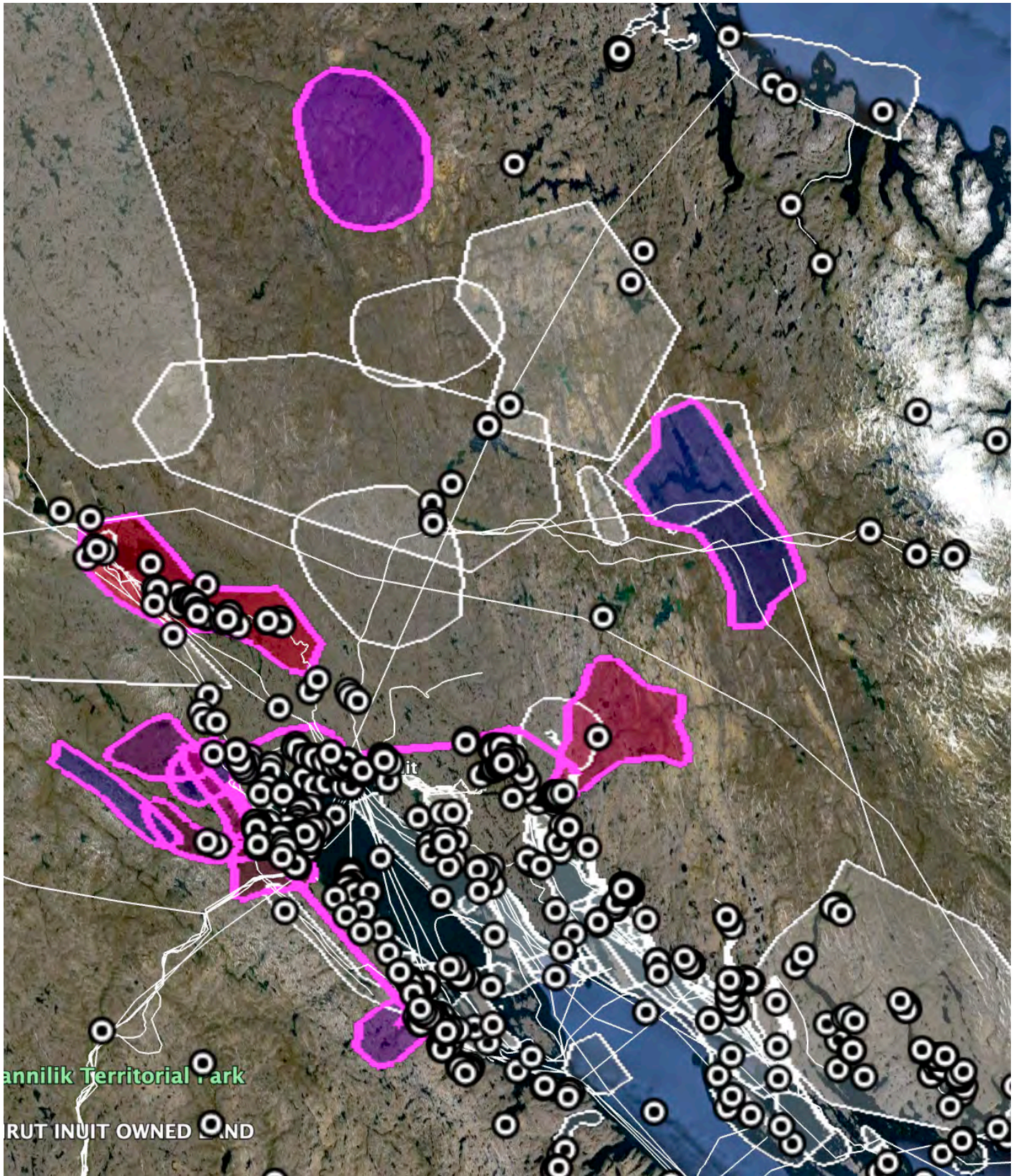


Figure 8: Snapshot from GIS mapping tool used to record and display site-specific data points reflecting areas of reported use and/or value around Iqaluit. This information was gathered during interviews from the Tusaqtavut study, and resulted in 1287 mapped data points.

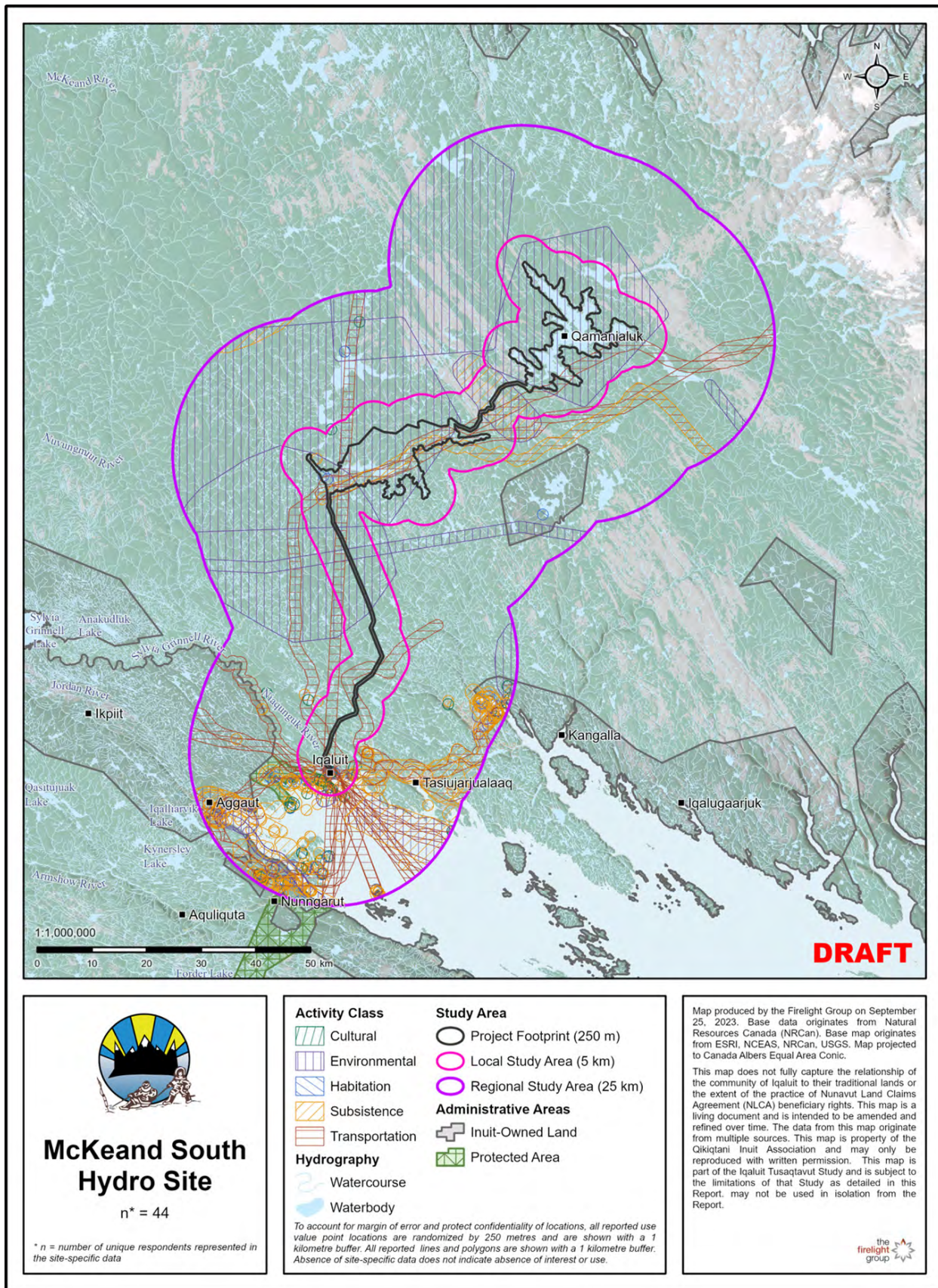


Figure 9: Kuugaluk River reported site-specific values, and their associated areas, within the Study Area for NNC’s potential renewable energy development.

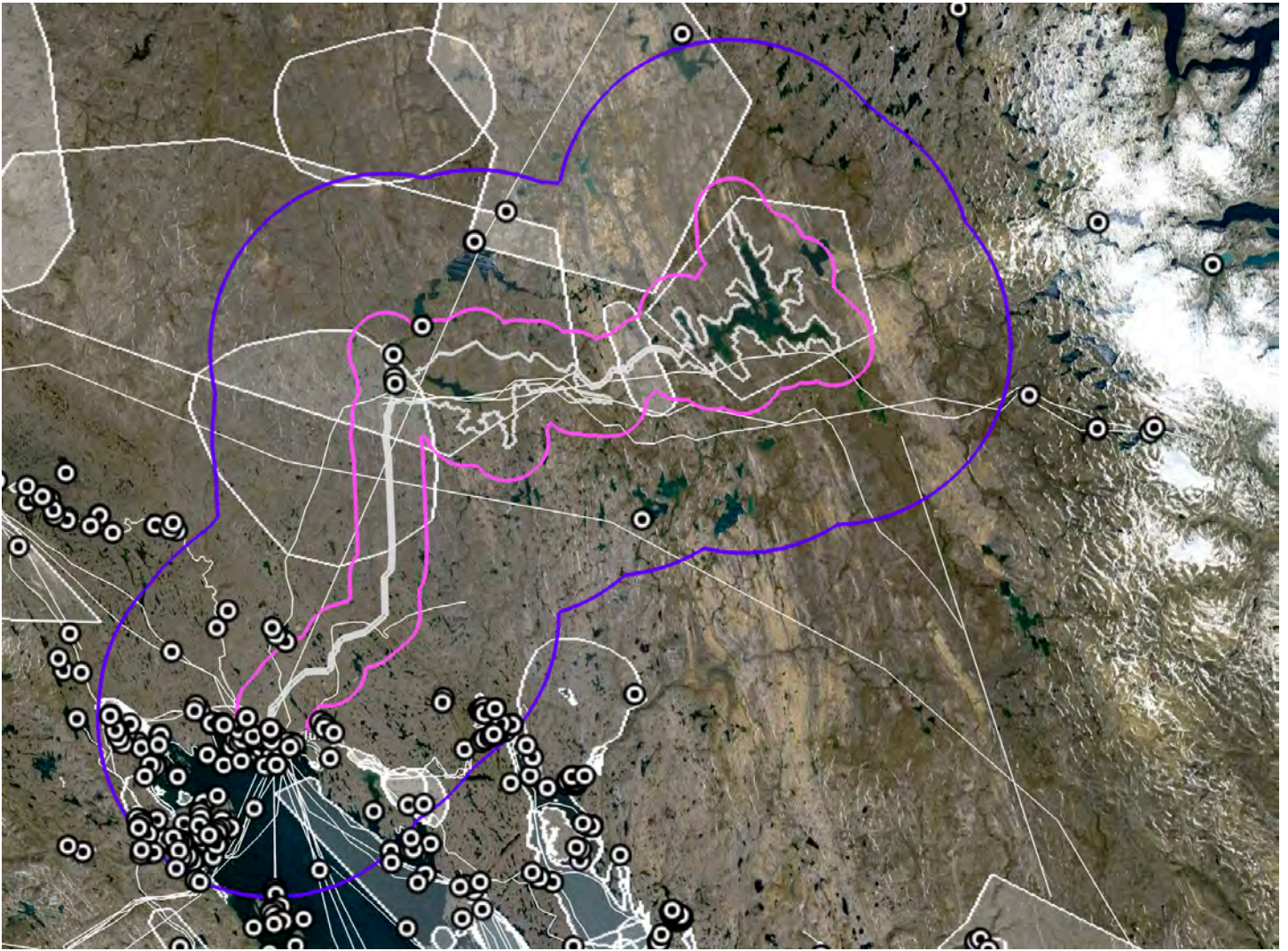


Figure 10: Snapshot from GIS mapping tool used to record and display site-specific data points reflecting areas of reported use and/or value around Kuugaluk River. This information was gathered during interviews from the Tusaqtavut study.



Site-specific values were mapped and compiled in a GIS setting where Inuit land use was considered a constraint during technical concept generation. This information was instrumental in evaluating the community and social impact of the various development alternatives.

In addition to mapping Inuit land use on Southern Baffin Island, the Tusaqtavut study provided insight into identified concerns, potential interactions, and attitudes toward renewable energy development. Baseline concerns focus on wildlife, habitat, and land use. Wind turbine-specific concerns include impacts on the bird population and noise pollution. Hydroelectric power-specific concerns include changes in salinity, sea ice formation, water collection, interruptions to fish movement, mercury production, and effects on downstream water flow. The attitude towards renewable energy of Iqalungmiut interviewed was broadly positive, with an understanding of the need to move away from diesel power generation, and a desire for further project information.

4.1.2 Environmental & Regulatory Evaluation

The Environmental & Regulatory Evaluation for the Iqaluit Nukkiksautiit Project was prepared by Sikumiut Environmental Management Limited (“SEM”) to address and outline environmental and regulatory considerations for the project’s renewable energy alternatives. The evaluation summarizes existing environmental baseline information, addresses environmental and regulatory risks, identifies necessary baseline information to proceed with the environmental assessment and permitting process, and provides an overview of the applicable regulatory considerations extending to later project stages.

The baseline environmental data for this evaluation was primarily obtained from an existing series of feasibility studies undertaken by KP from 2005 through 2012 for QEC regarding potential hydroelectric project sites near Iqaluit. These studies include hydrological analysis, aquatic environment investigations, environmental baseline studies, and more. A broad scope of baseline surveys was undertaken during QEC’s study period for Qigirrijaarvik only, presenting a significant gap in available data between the various alternative sites in this evaluation.

The evaluation summarized the biophysical environment of the project alternatives based on available data for each site, including climate and meteorology, bedrock geology, hydrological features and hydrogeology, groundwater and surface water quality, sediment quality, freshwater environment, fish & fish habitats, marine environment, terrestrial landforms & vegetation, terrestrial wildlife & habitats, and birds & bird habitats.

The project’s regulatory process will have significant implications for the overall schedule and cost. The project will be assessed in accordance with the NLCA and the Nunavut Planning and Project Assessment Act (“NuPPAA”), with the Nunavut Planning Commission (“NPC”) being the point of entry into Nunavut’s integrated regulatory system. After assessing conformance to any applicable Land Use Plan (“LUP”), there will be a screening conducted by the Nunavut Impact Review Board (“NIRB”), and approval by the Nunavut Water Board (“NWB”) if applicable. Coordination of this environmental assessment process among the NPC, NIRB, NWB, federal agencies, and municipal government can be beneficial to the overall project schedule. It is critical that the environmental assessment be completed before other regulatory authorizations will be issued.

Given the precedent set by the proposed Iqaluit Hydroelectric Project in 2013, it is probable that any hydroelectric or Pumped Storage Hydro (“PSH”) alternatives will necessitate a full environmental impact review by the NIRB. The preparation of an Environmental Impact Statement (“EIS”) involves a broad and comprehensive scope of study, and it has been suggested to initiate studies as early as possible. For hydroelectric and PSH alternatives, additional regulatory tasks include obtaining a Fisheries Act Authorization (“FAA”) from Fisheries and Oceans Canada (“DFO”) by quantifying and offsetting risks posed to fish habitat by the project, as well as establishing annual water use fees regulated by the NWB based on the generation capacity of the project.

Comparatively, the wind farm alternatives are unlikely to face these additional regulatory tasks and may not require a full environmental impact review, based on the project’s footprint and number of turbine generators. This rationale is supported by the fact that the Anuriqjuak Nukkiksautiit Project (a wind and battery energy storage project that NNC is advancing in partnership with the community of Sanikiluaq) was not required to move through a full NIRB review. Land tenure of the project site, roads, and transmission routes is another important consideration, involving negotiations for various land leases requiring different procedures, leases, and agreements.

An environmental sensitivity evaluation was completed for the various alternatives to support a project selection risk screen matrix on the parameters of biophysical environment, regulatory, and protected areas.

- The biophysical environment scoring evaluates the physical footprint of the project’s elements, encompassing wind turbines, watersheds, reservoirs, transmission corridors, roads, and related construction, to quantify the impact on both terrestrial and aquatic habitats. This includes disturbances such as noise pollution, vehicle emissions, and changes in water quality.
- Protected areas scoring assesses the extent of intrusion by project infrastructure into areas designated in legislation such as national and territorial parks, or reserves.
- Regulatory scoring is based on the anticipated effort to fulfill regulatory requirements in terms of time and cost, as well as the extent of stakeholder concerns.

Several ranking sessions were conducted with SEM’s in-house environmental professionals, environmental assessment specialists, aquatic and terrestrial biologists, professional engineers, and permitting specialists. The findings of the environmental sensitivity evaluation will be discussed further in the subsequent alternative analysis.

SEM has provided recommendations encompassing various environmental tasks and project design considerations essential for the upcoming stages of the project. These include fish sampling, extensive freshwater and marine aquatic surveys, surveys using acoustic technology or cameras to monitor migrating birds, ground-based and aerial surveys for avian and wildlife migration, and the development of wildlife habitat models. Project design environmental considerations have been detailed for incorporation into the next phase of the project, including potential effects of project infrastructure and design consideration and mitigation measures. Consideration and mitigation measures largely center around avoiding construction near sensitive wildlife, bird, and marine habitats to avoid habitat loss and species displacement, especially during the breeding season for bird and wildlife species.

4.1.3 Iqaluit Renewable Energy Alternatives Generation Report

The Iqaluit Renewable Energy Alternatives Generation Report, completed by Canadian Projects Limited (“CPL”), provides an overview of the technical and economic feasibility of a wide range of renewable energy development alternatives for the city of Iqaluit and employs an alternatives screening matrix to advise the project team on the most beneficial alternatives to advance.

The primary technologies investigated in the report are conventional hydroelectricity, wind power, and pumped storage hydro (“PSH”). These technologies are commercially mature, and can meet the economic and technical requirements of offering a diesel replacement solution for the city of Iqaluit, as set out by project mission. Hydroelectricity is the energy from water pressure and flow through a turbine which turns an electric generator that produces electricity. In conventional hydroelectricity, a dam is used to create a reservoir or lake where excess water from the low-demand summer months can be released in the high-demand winter months, when there is less stream flow, to meet the power needs. Several freshwater lakes and rivers around Frobisher Bay are suitable locations for hydroelectricity, characterized by seasonal ice coverage from December to mid-May, and high flow in June and July.

Wind power is the energy from wind spinning blades (rotors) which spin an electrical generator and produce electricity. Eastern Nunavut possesses a substantial wind resource, with elevated coastal regions experiencing consistent and potent winds considered commercially viable for wind energy.

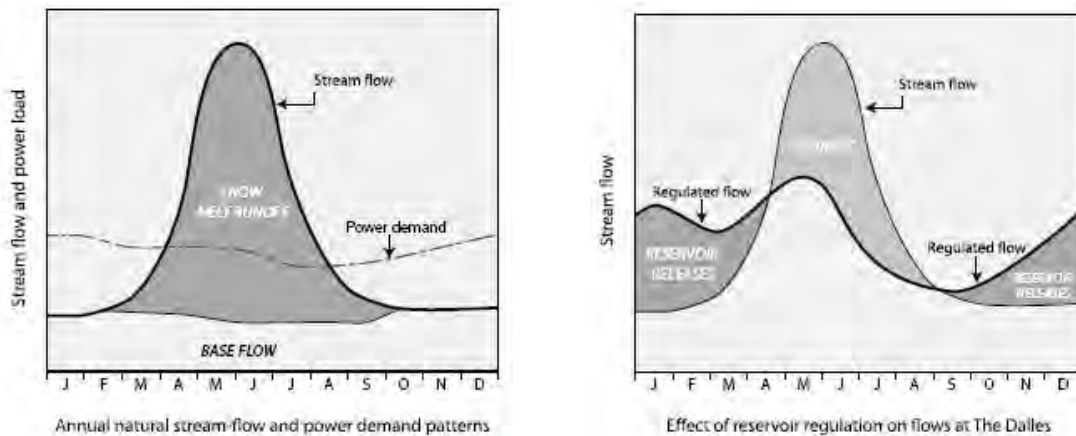


Figure 11 - Water Flow

PSH is the same as conventional hydroelectricity, except it harnesses the elevation difference between an upper and lower reservoir, and uses a special turbine-generator that can also be used as a pump motor to pump water back to the upper reservoir for storage. PSH is often implemented to improve an intermittent energy source, effectively acting as a battery to store and dispatch energy as necessary. In this analysis, PSH is considered in addition to wind. PSH operates between two cycles: (1) the recharge cycle, when wind energy generated beyond demand is used to pump water from the lower reservoir to the upper reservoir, and (2) the discharge cycle, when the energy demand is higher than the available wind energy, and water flows from the upper reservoir to the lower reservoir generating hydroelectricity. CPL’s site investigation explored the most attractive renewable energy development alternatives within 200 km of

Iqaluit; thorough regional surveys for new renewable energy developments via desktop review, as well as independent assessments of previously established sites, were undertaken. Identification of prospect alternatives involved evaluating the available energy potential and characterizing the main site parameters for each alternative. Early concept development, including rough locations for project infrastructure, was completed for alternatives deemed technically and environmentally feasible. Site visits were conducted by CPL staff and project team members to investigate site-specific features and geological conditions and assess hazards of the development and the transmission line corridors.

Hydroelectric concept design focused on optimal head, flow, and reservoir combinations, while wind sites were based on topography and wind resources. Iterating between concept development and power and energy modeling allowed for project sizing to be optimized to meet the design energy load profile and minimize aggregate Levelized Cost of Energy (“LCOE”), resulting in the completed concept designs with finalized concept layout and sizing of 16 renewable energy alternatives between 9 different sites.

Alternative	Project	Technology	Installed Capacity (MW)	Capacity Range (MW)
1	Armshow River	Conventional Hydro	10	10-15
2	Armshow South	Conventional Hydro	5	5-10
3	Qigirrijaarvik Inlet	Conventional Hydro	10	10
4	Kangala	Conventional Hydro	10	10-20
5	Kuugaluk North	Conventional Hydro	10	10-50
6	Kuugaluk South	Conventional Hydro	10	10-30
7	Iqaluit Kuunga Bend	Conventional Hydro	10	10-30
8	Iqaluit Kuunga Jag	Conventional Hydro	10	10-40
9	Niaqunguk Wind	Conventional Hydro	10	10-30
10	Qasitujuak Lake Wind	Wind	10	10-30
11	Kynersley Lake Wind	Wind	10	10-30
12	Armshow Lake Wind	Wind	10	10-30
13	Qigirrijaarvik Inlet Wind	Wind	10	10-30
14	Qigirrijaarvik + Wind	Conventional Hydro + Wind	15	15-45
15	Qigirrijaarvik PSH+Wind	PSH	15	10-30
16	KI PSH + Wind	PSH	30	20-60

Table 7 - Alternatives Comparison

The power and energy analysis involved the development of a custom time-series-based power and energy model using multi-year data and integrating concept-specific and technology-specific constraints. A basic islanded grid power system was modeled, with elements including wind and hydroelectrical generation, supplemented with a PSH system, a step-up transformer, an overhead transmission line, a step-down transformer, existing diesel generation and a Battery Energy Storage System (“BESS”), all which tie into the existing electrical distribution system within the city of Iqaluit. A net efficiency value was applied on each generation type for all power generated, and unit rates for CAPEX and OPEX components were established, along with continued diesel costs. Early economic modeling through the entirety of the

50-year economic planning period provided estimates of CAPEX, OPEX, lowest cost of electricity (“LCOE”) Renewables, and LCOE Aggregate for the 16 renewable energy alternatives. Additionally, alternatives were analysed based on technical and design considerations, capturing factors such as constructability, cold climate effects, scalability, and energy demand uncertainty. The techno-economic insights provided by the feasibility study were applied to the alternatives screening matrix to narrow down the top choices, and eventually decide upon a recommended alternative for further project development.



4.2 Analysis Results

Two decision analysis tools were selected and used for the Alternatives Screening exercise. The objective of these exercises was to incorporate social, environmental, technical, and economic considerations into the decision-making.

- 1. Combinative Distance Based Assessment ("CODAS")** – Alternative Screening and Ranking
- 2. Force Field Diagram** – Analysis of the 'Top 3' Alternatives

4.2.1 Alternatives Screening Matrix & CODAS Method

The alternatives were ranked based on the average of their relative scores across six weighting scenarios. This array of scenarios highlighted different criteria as more or less important, to get a sense of how rankings would shift according to different priorities.

It was decided to choose a final ranking of alternatives based on Weighting Scenario A, which has the most balanced weighting with respect to the three-legged stool approach as introduced in Section 1.1. This weighted approach was chosen to allow for certain attributes to have greater impact on the overall ranking. For example, "Community Land Use" was assigned a 15% weighting, while "Geotechnical Risk" was only 1%. This means that "Community Land Use" has a larger impact on the ranking in comparison to "Geotechnical Risk".

Scores for the technical and economic criteria were evaluated and assigned by CPL, while environmental and stakeholders scores were determined with input from Growler, NNC, Landsvirkjun Power ("LVP"), SEM and Firelight.

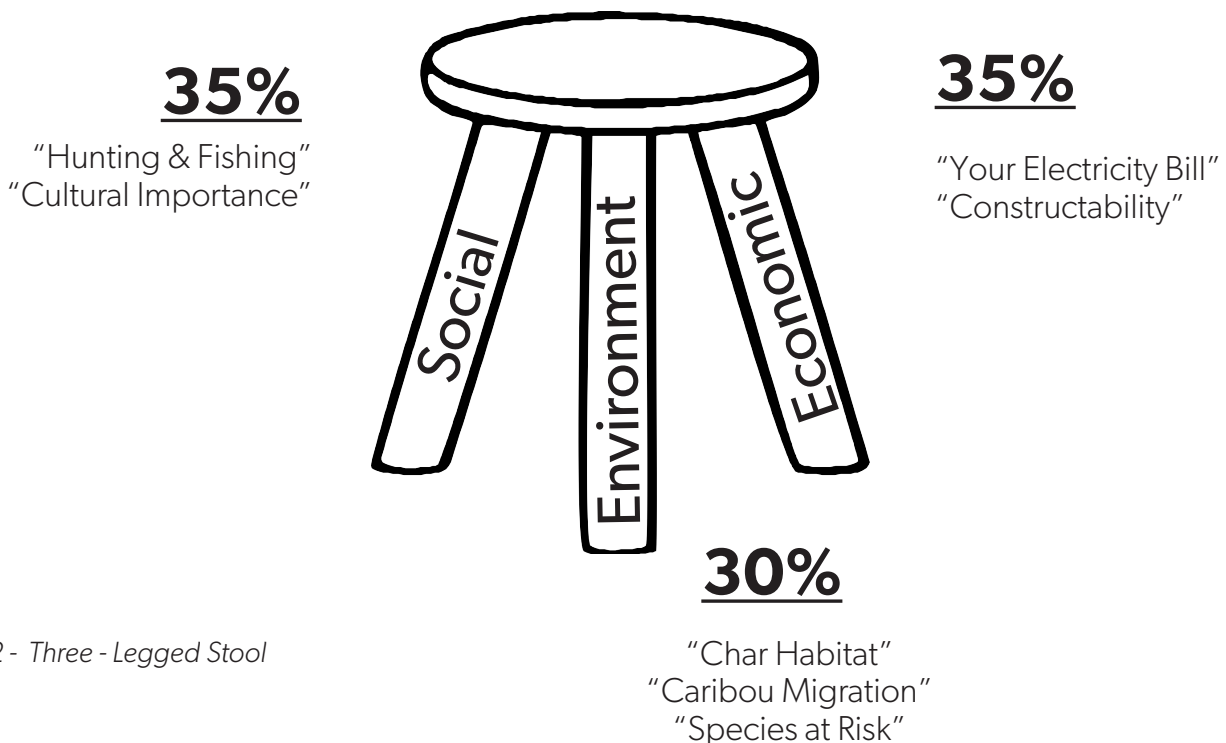


Figure 12 - Three - Legged Stool

Social		
Attribute	Description	Weight (%)
Community Land Use	Impacts to fishing and harvesting patterns, hunting, foraging, use for recreation and tourism. This is the most heavily-weighted attribute.	15%
Economic Benefits to the Community	Direct and indirect contributions to the local economy during construction and throughout the project lifecycle including employment, service industry benefits, growth potential associated with any inherent surplus sustainable energy supply.	5%
Rightsholder & Stakeholder Support	Perceived or actual support (or opposition) from Rightsholders, the public, utility, government and regulators. This is the 'social license' evaluation of the alternative.	4%
Public Health & Safety	Perceived or actual risk to the public during construction and operations. Electrical safety, reservoir fluctuations during ice covered period, wind turbine noise, visual health impacts are all considered.	5%
Scalability to Support Community Growth	This attribute was considered from both a community benefits perspective and an environmental impact perspective. This is considered an important attribute; alternatives that can grow with the community are considered valuable to long term sustainability.	6%
Social Weighting		35%

Technical		
Attribute	Description	Weight (%)
LCOE Aggregate (Electrical)	The levelized cost of energy (LCOE) Aggregate is the best indicator of the 'impact' on the electricity bill for Iqalungmuit and factors in renewable energy and QEC diesel requirements. This attribute considers only the electricity load for the City.	15%
LCOE (Electrical, thermal, Industrial)	This attribute considers the ability to accommodate the replacement of home heating and industrial loads (currently running on heating fuel), with renewable energy. It is a future-facing attribute.	15%
Reliability, system integration and transmission length	Risk of power outages and any perceived complications with integrating into the current Iqaluit distribution system.	3%
Geotechnical Risk	Technical risks related to geotechnical conditions. Rock quality for tunnelling, availability of material for dam construction.	1%
Constructability	Complexity, availability of specialized equipment, reliance on weather windows, level of interfacing required, experience.	1%
Technical Weighting		35%

Environmental		
Attribute	Description	Weight (%)
Biophysical Environment	Interactions including vegetation/habitat as well as aquatic, terrestrial, and avian species. Include potential adverse effects on Species at Risk, contaminant uptake (ecological risk), population dynamics and habitat disturbance / disruption / destruction. Consider the potential for residual adverse effects to be significant.	10%
Protected Areas	Parks or wildlife, ecological, conservation reserves potentially affected by the project. Please note that there can also be 'showstoppers' under this attribute.	2%
Permits, Approvals & Schedule Timelines	Perceived or actual level of effort, risks, issues with lack of framework or possible changes, number of required permits and approvals. Impact to land use planning process.	5%
Climate Impacts: emissions and resource availability	Perceived impacts (positive or negative) on overall emissions in Iqaluit. Consideration is given to 'risk' of future facility operations based on climate change modelling.	2%
Footprint, scalability and access impacts	Ancillary consequences of increasing footprint, including ice formation, effects of access on both public and wildlife.	8%
Cold climate risks	Risks associated with formation of ice and other natural phenomena associated with project footprint	3%
Environmental Weighting		30%

Relative scores were developed using the CODAS method to assess the alternatives against one another. Based on the results of the relative scores from the alternatives screening matrix, a normalized score of 1.0 (100%) for the highest-ranking alternative and a score of 0.0 (0%) for the lowest was assigned.

Rank	Alternative	Score
1	Kuugaluk South	100%
2	Niaqunguk Wind	74%
3	Qigirrijaarvik + Wind	70%
4	Qigirrijaarvik Wind	66%
5	Qigirrijaarvik PSH + Wind	62%
6	Armshow Wind	51%
7	Qigirrijaarvik	51%
8	KI PSH + Wind	50%
9	Qasitujuak Wind	48%
10	Kynersley Wind	47%
11	Armshow South	45%
12	Kangala	40%

13	Kuugaluk North	22%
14	Armshow River	9%
15	Sylvia Grinnell Bend	0%
16	Sylvia Grinnel Jag	0%

Table 8 - CODAS Results

The characteristics of the three highest-ranking alternatives, Kuugaluk South, Niaqunguk Wind, and Qigirrijaarvik + Wind, as of the completion of the feasibility report, are detailed below.

		Kuugaluk South Hydro	Niaqunguk Wind	Qigirrijaarvik Hydro & Wind
Rank		1	2	3
CODAS Ranking Score	100%-0%	100%	74%	70%
Electric Load				
Capacity	MW	10	10	15
Renewable Supply	%	100%	53%	100%
Renewable LCOE	\$/MWh	\$335	\$250	\$389
Aggregate LCOE	\$/MWh	\$338	\$571	\$462
Electric, Thermal, & Industrial Load				
Capacity	MW	30	30	45
Renewable Supply	%	79%	45%	73%
Renewable LCOE	\$/MWh	\$163	\$170	\$226
Aggregate LCOE	\$/MWh	\$378	\$607	\$462
Environment / Socio-Economic				
Scalability	Max Score 1-5	3	5	2
Biophysical Environment	Min Score 1-5	5	3	4
Resource Use	Min Score 1-5	2	2	2

Table 9 - Characteristics of Top Three Project Alternatives

4.2.2 Force Field Analysis

While Kuugaluk South emerged as the top-ranking project based on its CODAS ranking score, followed by Niaqunguk Wind and Qigirrijaarvik Hydro + Wind, it was still necessary to apply further review and analysis of the top three alternatives.

To assess the nuances and merits of each option, the Force Field method of analysis was used to determine if there were any factors contributing to driving forces or restraining forces for either of the three concepts, including the following criteria from the three-legged stool development approach:

- Social:** Respecting and incorporating project Rightsholders into all project phases is of utmost importance. Renewable energy project alternatives with minimal or no overlap with Inuit land uses and values established in the Tusaqtavut study are favourable.
- Environmental:** Minimizing and mitigating the project's environmental impact is critical; fewer known biophysical risks, and ecological effects that require consideration and study, are advantageous.
- Economic:** The economic and technical aspects of the project alternatives represent the overall business case, with driving forces such as the LCOE, constructability, renewable energy production, scalability, and stakeholder support.

The following force field diagrams illustrate each alternative's driving and restraining forces based on these criteria. The scale, 1 to 5 for driving forces and -1 to -5 for restraining forces, is qualitative and subjective to compare the three alternatives. The total score is the sum of all the forces, with a score greater than 0 indicating that the driving forces outweigh the restraining forces.



4.3 Community Evaluation

From the outset, it was decided by the project team to centre Free, Prior, Informed Consent (“FPIC”) in decision-gate public engagement sessions. This concept is protected by international human rights standards, and is highlighted as crucial through the United Nations Declaration on the Rights of Indigenous Peoples (“UNDRIP”), and the associated Canadian federal government’s statute. FPIC is the mechanism through which economic self-determination can occur – which, in the context of this work, depends on energy sovereignty.

No specific published examples, models, or templates on how to quantitatively or qualitatively achieve FPIC for Arctic renewable energy projects could be found through our secondary research efforts. The project team is aware of other community-led renewable energy projects in the Canadian Arctic, such as in Old Crow, Yukon, and Inukjuak, Nunavik. Available resources on these projects were reviewed, and contacts made with both of those communities to get a sense of their approach to this work.

Iqaluit, and Nunavut as a whole, has unique community and governance dynamics; and, relationship legacies with developers, industry, and utilities. As such, the project team endeavored to create a process that best fits the on-the ground limitations and needs of Iqalungmiut. It is understood that this will be an iterative process where community feedback and our learnings will continually refine the structure and methods.

From publications of the Food and Agricultural Organization (“FAO”) of the United Nations (Food and Agricultural Organization of the United Nations, 2016), we are able to adapt and redefine a process for our specific needs in seeking and upholding FPIC for the Iqaluit Nukkiksautiit Project. Through this phase of work, we completed points (1) through (3), and began to work on point (4), in the following flow chart sourced from the FAO’s manual for project practitioners on FPIC.



Figure 13 - FAO Flow Chart

“FPIC is not just a result of a process to obtain consent to a particular project; it is also a process in itself, and one by which Indigenous Peoples are able to conduct their own independent and collective discussions and decision-making. They do so in an environment where they do not feel intimidated, and where they have sufficient time to discuss in their own language, and in a culturally appropriate way, on matters affecting their rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage (tangible and intangible).”

--Manual For Project Practitioners, Free Prior and Informed Consent – An Indigenous Peoples’ Right and a Good Practice for Local Communities (Food and Agriculture Organization of the United Nations)

Method and Delivery

Two main engagement sessions were delivered during this work phase. Both events were advertised via NNC’s social media accounts, posts in local Facebook groups, posters in high-traffic areas around town (coffee shops, post office, grocery stores, college and museum, shopping plazas, banks), and when possible, radio interviews. Postcards with the event details were also sent to every mailbox in Iqaluit in advance of the events to reach community members at the household level.



Figure 14 - Open House Invite



Figure 15 - NNC Postcard

Culturally-appropriate snacks and refreshments, such as bannock and smoked meat and fish, were provided to coincide with each of the presentation times throughout the day, along with full-day access to hot beverages.

Inuktitut translations for all written materials, and live Inuktitut-English interpretation for the verbal presentation and question and answer periods were provided. A bilingual staff member was available during the entirety of the first open house to support any unilingual participants in their review of the posters.

All participants were entered to win door prizes, consisting of \$100 - \$200 gift cards for NorthMart (local grocery store), gas, and Amazon (frequently used online shopping site for affordable groceries in Iqaluit). Children who attended were entered to win a bicycle of their choosing, within a range of options to suit different ages and colours. Renewable energy themed colour sheets and juice boxes were set up at a kids' table, to support any families who brought their children with them to the event.

Local media outlets were advised of the event in advance, and invited to attend and report on the engagement process and outcomes.

1.Let's Talk Energy

In June, 2023, based on advice from local engagement firm, SIJJA Consulting, we initiated our Phase 2 public engagement process with Iqalungmiut focusing on public education. Before Inuit can be expected to make a decision about what kind of renewable energy project they'd like to see for their community, there needs to be an opportunity to learn about:

- Who NNC is as a company
- Our phased development approach and FPIC
- Advantages and disadvantages of different types of technologies;
- The opportunities that renewable energy offer and how it can benefit Inuit and the community;
- The connection between Inuit Societal Values, Inuit Qaujimajatuqangit, and renewable energy;
- Analogous examples across the Arctic where renewable energy projects have already been built and are supporting communities;
- Energy Sovereignty;
- The realities of diesel dependence;
- How to stay in touch and share questions or feedback; and,
- What to expect as the next steps.

A series of pop-up banner-style posters on these topics was developed and set up around the room in a circle, to reflect traditional Inuit communication style and decision-making format.

Equally important to information sharing was to seek information and perspective from the community. Large blank-canvas posters were set up around the room with prompts (and answers, in italics) such as:

- If you were in charge and money were no object, how would you change Iqaluit?
 - o *Cost of living*
 - o *Multiple tiny homes on a renewable energy model*
 - o *Have a ferry linked to mainland Quebec in all seasons*
 - o *Create a highway towards Kimmirut as best as possible*
 - o *No homelessness*

- What is your hope for Iqaluit in 30 years?
 - o *Fossil fuels gone from energy*
 - o *Gender equality in clean energy transition*
 - o *Have a link to some mainland (via Kimmirut or Igloodik) to the rest of Canada to lower costs*

- What concerns do you have about renewable energy? Diesel Power Plants?
 - o *Fish habitat, greenhouse gas emissions*
 - o *Projects don't last long since maintenance can be expensive / specialized*

- What would make Iqaluit cooler than it is now?
 - o *Self-reliance so that supply is consistent*

- What questions do you have?
 - o *Have you considered/looked into wave or tidal energy production from the ocean?*
 - o *What are the barriers to project success?*
 - o *How can the general public support a change to those barriers?*

This event was held in an open-house style, open to the public from 12 noon until 8:30pm. The aim of the posters was to facilitate self-guided learning and sharing that could move at whatever pace an individual preferred, with the ability to conduct one-on-one conversations and personalized question and answer opportunities.

At 3:30 PM and 7 PM, round-table style presentations were held, to offer a more interactive and oral story-telling approach to education. A targeted third presentation (with the same content) was held at 10:30 AM (prior to doors opening to the public) for key stakeholders in the community such as: the Government of Nunavut, the Climate Change Secretariat, Qikiqtani Inuit Association, Hunters and Trappers Associations, Nunavut Tunngavik Incorporated, Qulliq Energy Corporation, and Iqaluit City Council.

The timing of this event aimed to coincide with the end of the school year, prior to students being released for summer break. This ensured that engagement was not expected from the community during the summer season when many families spend most of their time out of town, on the land; but, it would be top of mind just in advance of that time when families would be unburdened from much of their work and school responsibilities. The hope was for Iqalungmiut to have time to discuss and process the information they learned over the summer, and be ready to receive more project-specific details in the autumn.

Feedback on this engagement effort, as collected from a survey distributed during the event, can be found in the table below:

1. What stands out as the most important thing(s) you learned?

- Learning how other countries in the Arctic have transitioned to renewable energy.
- Deep symbolism of the Qulliq. Then/Now/Future
- NNC is open to feedback. Project in Iqaluit is happening.
- We use 15 million litres of diesel a year for energy generation. It is very possible to use renewable energy.
- That there are many options for renewable energy in Iqaluit!
- The stores of Greenland and Iceland.
- Be more happy and talk louder lol

2. What surprised you today?

- Pumped energy- I had not heard of that before. Glad to hear so much research has already been done.
- Good to hear of similar regional projects are out there to learn from.
- We use 15 million litres of diesel a year for energy generation. It is very possible to use renewable energy.
- That there are community members that are resistant to change + renewables
- Well done! "Stats"--> contextual + culturally relevant (eg 200 snowmobiles)
- That finally this is happening.

3. What is missing that you would have liked to learn about?

- Integrating current diesel generation system with renewable projects.
- Like to hear specifics on an example to think of the lived experience.
- Nuclear.
- As a mother/anaana, gender equality in energy sovereignty.
- If we could go for tour for what's happening.

4. Was anything we presented unclear or confusing?

- No
- How are these funded? By self or within groups/partners?
- No
- Lots of terms/vocabulary that I am not familiar with.
- It was amazing and understandable.

5. How could we improve this event, and/or attract more people?

- Difficult to attract more people on a sunny day. I really liked the presentation format.
- Good to get general public feedback but I also appreciate the specialists being highlighted. So this is a mix of knowledge/sharing levels.
- Not sure.
- Community consultation needs to include quiet voices. Perhaps explore ways to engage online via surveys, and explainer videos.
- Luncheon format, casual format, small bits of info- all excellent. Always tricky, such a gorgeous day.
- Next time hold meeting/gathering outside.
- More free food should be provided lol

6. What do you think of renewable energy in Iqaluit?

I believe development of renewable energy in Iqaluit is long overdue.

- Multiple Inuit voices must be encouraged, supp[orted, heard and amplified.
- It is good. Easier to discuss/edit a specific proposal.
- Very essential and possible, very behind right now compared to similar places.
- I love it! So excited about this!
- Get Inuit youth on board, get Inuit women/women leaders involved->support their voices
- Amazing

Figure 16 - Community Engagement Questionnaire

In total, ~60 participants attended the event over the course of the day.

2. Have Your Say – Shaping Iqaluit’s Energy Future

In November, 2023, the project team carried out a follow-up engagement effort to share specifics about all 16 renewable energy options /opportunities that were identified around Iqaluit, and all data from the technical /economic, environmental, and social /cultural streams of analysis that equally determined a ranking order according to overall viability. An essential component of FPIC is to present options to a community at each stage of work, study, or development before any actions have been taken, to centre local voices in decision making about how to proceed – this is required for consent to be “prior”.

In the June Let’s Talk Energy session, we promised community members that during our follow-up session in November, we would share all of our work done to date on all the possible options for renewable energy in and around Iqaluit. An essential component of FPIC is to present the full range of possibilities, without any premature narrowing down – this is required for consent to be “informed”. Additionally, the project team acknowledges that their perspectives and analyses are limited and must be vetted by community members. It is our belief that communities know best about their needs, and the surrounding landscape, and no model or remotely studied data set can ever replace the invaluable vision of community.

Another essential component of FPIC is to present the opportunity to say no as an equal and valid choice amongst any proposed development opportunities, with the same breadth of information about the realities of that choice – this is required for consent to be “free”.

This event was broken out into three sessions:

1. Inuksuk High School Students (November 21st from 1 PM to 2PM, including ~50 students)
2. Key stakeholders – the Government of Nunavut (including the Premier of Nunavut), the Climate Change Secretariat, Qikiqtani Inuit Association, Hunters and Trappers Associations, Nunavut Tunngavik Incorporated, Qulliq Energy Corporation, and Iqaluit City Council (November 22nd from 10 AM to 12 PM)
3. General public (November 22nd from 6 PM to 9 PM, at the Aqsarniit Hotel and Conference Centre).

The main concern and risk for this public engagement event was information overload, given the depth and breadth of data and analysis needed to be covered in order for participants to meaningfully submit their ballot with the tenants of FPIC upheld. Our approach was to provide the information in as many different ways as we could, and give space and time for the community to metabolize the information, discuss and review it at home with their families, colleagues, and neighbours. This included:

- Giving people dedicated time to review the information in visual and written format on posters at their own pace, and supporting participants with any questions at a one-on-one level (with the exception of the high school session, due to a limited amount of time)
- Delivering a guided group presentation with visual aids via a slide deck.
- Including representatives from all three sub-contractors responsible for technical/economic, environmental, and social/cultural scopes to participate in the presentation and live question and answer period, to ensure community members had access to experts in each field.
- Holding a live question and answer period following the group presentation
- Displaying virtual animated fly-through videos of in-situ infrastructure renderings for the top 3 ranked options.
- Providing a booklet for people to take home, or review independently at the event, in the case that mobility was a barrier to reading the full-size posters around the room.
- Walking people through how to fill out the ranked ballot, and giving three options for submission:
 - o A secure drop-box was placed at the back of the room, at the event, for real time submissions.
 - o Paid-postage, addressed envelopes were provided for people to take home and use to submit by mail by December 6th (two weeks following the event).
 - o Two follow-up opportunities at the Iqaluit Visitor centre (December 5th and 7th from 1:30 to 4:30 PM) for people to engage with project team staff on the information in person, ask questions, and submit feedback.
- Provision of all event materials on the NNC website
- Recording all questions and answers from the sessions, and later posting on NNC website

Ultimately, following the multi-modal presentation of the 16 possible renewable energy projects, the goal of this event was to have community members fill out a ranked ballot, containing all 17 options (including continuing with status quo diesel), to indicate their 1st, 2nd, and 3rd preferred choices.

The advantages of a ranked ballot, over a single majority, first-past-the-post style ballot, are well established internationally regardless of sector or application. This method maximizes the quantity and quality of data collected, with only a single touch point required to capture the data. It avoids vote splitting and strategic voting, giving the best representation of what people would ideally like to see happen, as well as what they would accept as runner up alternatives.

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03				ᐅᓂᓇᐅᓂᓇᐅᓂᓇ - NIAQUNGUK WIND
04				ᐅᓂᓇᐅᓂᓇᐅᓂᓇ - JAYNES INLET WIND
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15				ᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇ - SYLVIA GRINNELL BEND HYDRO
16				ᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇ - SYLVIA GRINNELL JAG HYDRO
17				ᐅᓂᓇᐅᓂᓇᐅᓂᓇ - CONTINUE WITH DIESEL
				ᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇᐅᓂᓇ IS THERE ANYTHING ELSE YOU'D LIKE TO SHARE WITH US?



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Voting Instructions

In the boxes indicated by arrows, mark one 'X' in each column to indicate your 1st, 2nd, and 3rd project choices that we should study further.

Figure 17 - Ranked Ballot Used for Community Voting

A legend poster was developed to display all the different options on a map of Iqaluit and the surrounding area. Participants were guided to begin their experience at the legend poster.

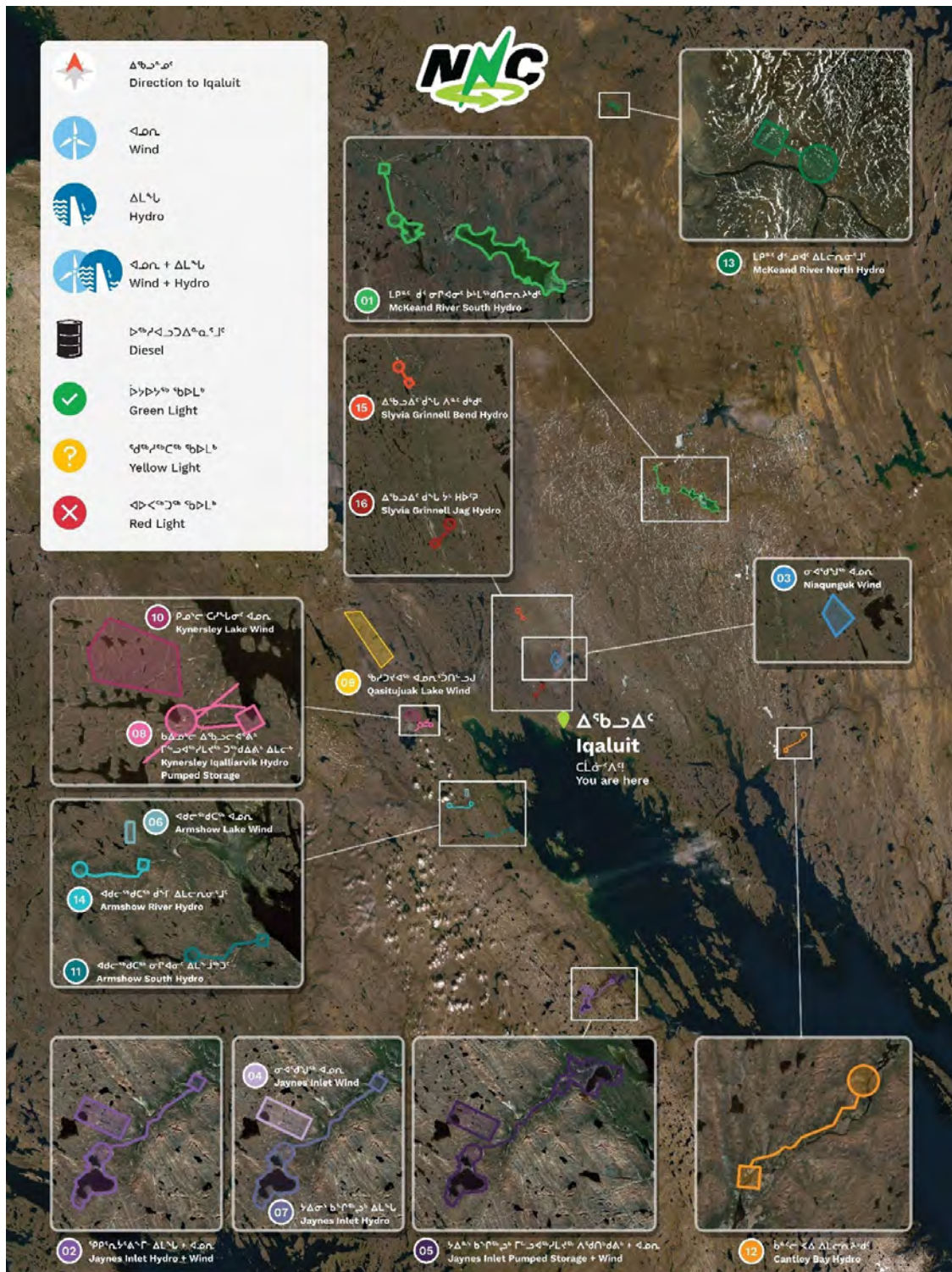


Figure 18 - Map of Proposed Projects



From there, 17 posters were set up around the room reflecting the geographic and spacial distribution of options on the map; i.e., participants would walk Southwest to see the options around Qigirrijaarvik, East to see options around Kynersley Lake and Armshow River, Northeast to see options around Sylvia Grinnell, etc. This method was employed to prompt participants to start thinking about the land, the relative positions of various watersheds and ridges in relation to Iqaluit, and leverage a sense of novelty and exploration to maximize engagement.

On each poster, the following pieces of information were displayed:

- Project Name (location/technology)
- Distance and direction from project site to Iqaluit
- Technology type (visual icon)
- Recommendation category (traffic light system: green is good, yellow is possible, red is to be avoided)
- Number reflecting ranking order (1: top ranked, 16: bottom ranked, 17: remain with diesel system)
- Summary points (positives, negatives, and items that need reflection or further study)
- Percent diesel reduction
- Ranking grade out of 10
- Bottom line summary of the most important take-away information

The first hour of both sessions on November 22nd was reserved for poster review and casual conversation.

Real Time Feedback

During the presentation to Inuksuk High School students, there was a general sense of excitement and curiosity about the potential projects. Students were very engaged, and teachers noted that their interest and participation was very high in comparison to other similar group presentations they have received. The project team captured all questions/comments, which are listed out below.

- *How tall are the wind turbines (referring to Niaqunguk Wind; 3rd ranked option)?*
- *Would you be able to see the wind turbines from town?*
- *How loud are the Wind Turbine Generators (“WTG”)?*
- *How many jobs would be created by the project?*
- *Can we work for NNC?*
- *What if the wind isn’t blowing?*
- *What happens if you run out of water (at Qigirrijaarvik)?*
- *How long is the road to the site?*
- *Will the site be fenced in (at Niaqunguk)?*
- *Would we be able to use the road?*
- *“They’d be so cool to look at” (WTGs)*
- *“You should just build that one” (Kuugaluk)*
- *Is the power generation impacted by freezing temperatures?*
- *Where can we get more information about the project?*
- *Which option is your favourite?*
- *Where are you in the phase gate process (and how long will it take to get through the process)?*
- *“If you’ve ranked all the options, why not just build the best one?”*

During the Key Stakeholder Session, there were many in-depth conversations during poster perusal, and following the presentation. It was clearly communicated that environmental monitoring and protection, as well as snowmobile trail and lake access were very important. There was an overall positive sentiment about the information presented, and the top-ranked option of Kuugaluk River South. A sense of desire and encouragement to move forward was noticeable. The project team captured all questions/comments, which are listed out below.

- *What is the timeline like for Feedback?*
- *How can we access the presentation?*
- *Are the wind turbines being considered here the same as what is being installed in Sanikiluaq?*
- *What is the capacity you are looking to build and what is the current/projected peak load for Iqaluit? We want to make sure we are building a project that lasts.*
- *Can you explain how caribou migration was taken into consideration to date and how things will be considered moving forward into the next phase?*
- *How will you be offsetting the land use for the road with ensuring we (Beneficiaries) still have access to using those paths for travel?*
 - o *What will the impact of the road be on future hunters?*
- *How will this infrastructure impact fish?*
- *Will we/the public be able to access the lake via the road for fishing/berry picking, etc?*
- *What will the O&M of the road look like/will it be publicly accessible? Will you regulate access to the lake and if so, how does that reflect my (Beneficiary) Right to fish/hunt on the land?*
- *Should check in with NTI/QIA re: skidoo paths and overlay those with the map of options*
- *Do you have the capacity to be involved in the regulatory/approvals process for five years so we don't have to keep starting over?*
- *Are there any options to take the spilled water and generate electricity from that?*
- *You should clarify if the char in these lakes are land-locked or not.*
- *Are there alternative layouts for these options?*
- *Does this infrastructure require federal funding support?*
- *Is there municipal support for this and what are the impacts of construction?*
- *Are there any economic development opportunities for Iqalungmiut?*
- *Impacts of blasting that will likely be required during construction?*
- *Are you building redundancy into this? What happens if there's an issue with the transmission line and then we suddenly have no power?*
- *Skidoo trails out to Sukanga are likely to be overlapping with the project footprint*
- *Requests for commitments to share more frequently with lands department at QIA*
- *It would be helpful to show the infrastructure on the lake to ensure folks have all information to make decisions about whatever it is they support*
- *Overlay access trails with maps would be helpful*
- *Paragrine (DeBeers) at one point was grooming a trail out to their Chidliak site that skidoo users could benefit from—could look at something like that to go around the flooded areas if the project footprint aligns with a skidoo path.*

The General Public Session reflected the same positivity and support noticed and felt in the previous two sessions. The project team captured all questions/comments, which are listed out below.

- *How involved is QEC—do they have a plan to meter the electricity and are they on board with a project like this?*
- *Would the transmission line be overhead or underground?*
- *What kind of materials make up a wind turbine?*
- *Do cold temperatures have a detrimental effect on wind turbines?*
- *Does the 50-year lifespan included in estimates here suggest the equipment will fail after 50 years or is that when the resource runs out? i.e., why is the lifespan capped at 50 years?*
- *A project like this is likely very expensive; what are the O&M costs associated with this?*
- *Can you talk about economic development opportunities associated with a project like this?*
- *Re: Nuclear/SMRs, why was it dismissed early on? Is it related to scalability?*
- *Will a project like this have any impact on mosquito populations, which are the bottom of the food chain for char?*
- *Will there be any impact on migratory birds?*
- *Is there only one year of data collection that is required on the environmental side? Would there be any compensation for Inuit who have lost access to fish that may have been impacted by something like this?*
- *Can you speak to the schedule and total cost for a project like this? Is building wind a faster/cheaper process?*
- *Pang has high winds and that has eroded some of the power poles—would that be an issue here as well?*
- *Human/animal travel and safety need to be highly considered in a process like this*
- *How are we immersing IQ into the technical studies?*
- *Impact on migratory birds also needs to be considered.*
- *Need to incorporate IQ into the work.*
- *“We know that diesel has many cons”, “We support this”, “I’m quite pleased”*
- *Have ice conditions been considered and will this infrastructure have an impact on freeze-up?*
- *Where can we get access to the Tusaqtavut Study?*
- *Prominent wind direction has changed over the years*
- *Inuit knowledge should be prioritized just as much as anything else*
- *Are there impacts on wind turbines? Steel is better, don’t look at plastic for this*
- *This is an excellent adult education opportunity. I can’t think of any way you could have made it better. Very thoughtful and considerately put together.*

Results

All participants of the three sessions were encouraged to take and submit an anonymous ranked ballot. High school students' ballots were included with those of the key stakeholders and general public. It is our belief that multi-generational infrastructure projects that will impact youth just as much or more as the general public of today should be equally guided by the voices of youth.

As of December 15th, 2023, the following table represents the data collected from all ranked ballots received to date, via the in-person event and the in-person follow-up sessions. Some ballots only contained a 1st choice indication, or only a 1st and 2nd choice indication, which is the reason for discrepancies in the vote totals.

	1st choice	% of 1st votes	2nd choice	% of 2nd votes	3rd choice	% of 3rd votes
Kuugaluk River South Hydro	32	76.19	4	10.53	1	2.70
Qigirrijaarvik Hydro + Wind	0	0.00	12	31.58	6	16.22
Niaqunguk Wind	4	9.52	12	31.58	13	35.14
Qigirrijaarvik Wind	1	2.38	0	0.00	0	0.00
Qigirrijaarvik Hydro Pumped Storage + Wind	1	2.38	3	7.89	2	5.41
Armshow Lake Wind	0	0.00	0	0.00	1	2.70
Qigirrijaarvik Hydro	2	4.76	1	2.63	0	0.00
Kynersley Iqalliarvik Hydro Pumped Storage	1	2.38	2	5.26	1	2.70
Qasitujuak Lake Wind	0	0.00	2	5.26	11	29.73
Kynersley Lake Wind	0	0.00	1	2.63	0	0.00
Armshow South Hydro	0	0.00	0	0.00	0	0.00
Kangala Hydro	1	2.38	0	0.00	0	0.00
Kuugaluk River North Hydro	0	0.00	0	0.00	1	2.70
Armshow River Hydro	0	0.00	0	0.00	0	0.00
Iqaluit Kuunga Bend Hydro	0	0.00	0	0.00	1	2.70
Iqaluit Kuunga Jag Hydro	0	0.00	1	2.63	0	0.00
Continue with Diesel	0	0.00	0	0.00	0	0.00
Sums	42		38		37	

Table 13 - Voting Results

In summary, Kuugaluk River South Hydro holds a strong majority of support (~76%) from the community members who participated in our engagement sessions and have submitted ballots.

	Project	Percentage of Respective Rank Votes (i.e. % of 1st place votes for 1st choice)
First Choice	Kuugaluk River South	76.19%
	Niaqunguk Wind	9.52%
	Qigirrijaarvik Hydro Pumped Storage + Wind	2.38%
	Qigirrijaarvik Hydro	4.76%
	Kynersley Iqalliarvik Hydro Pumped Storage	2.38%
Second Choice	Kuugaluk River South Hydro	10.53%
	Qigirrijaarvik Hydro + Wind	31.58%
	Niaqunguk Wind	31.58%
	Qigirrijaarvik Hydro Pumped Storage + Wind	7.89%
	Qigirrijaarvik Hydro	2.63%
	Kynersley Iqalliarvik Hydro Pumped Storage	5.26%
	Qasitujuak Lake Wind	5.26%
	Kynersley Lake Wind	2.63%
Sylvia Grinnell Jag Hydro	2.63%	
Third Choice	Qigirrijaarvik Hydro + Wind	16.22%
	Niaqunguk Wind	40.00%
	Qigirrijaarvik Hydro Pumped Storage + Wind	35.14%
	Armshow Lake Wind	2.70%
	Kynersley Iqalliarvik Hydro Pumped Storage	2.70%
	Qasitujuak Lake Wind	29.73%
	Kuugaluk River North Hydro	2.70%
	Sylvia Grinnell Bend Hydro	2.70%

Table 14 - Voting Summary

Additional qualitative feedback received on the voting ballots is as follows:

- *Please take into account the caribou migration for Kuugaluk!*
- *It would be nice to see this move faster. It has been way too long to see it happen*
- *Great work*
- *Announce potential business opportunities to the public to support business development – thank you for your work*
- *Please study dams with fish crossing built in with observation rooms to see the fish passing the dam if that river has char that migrate at Kuugaluk South. Plan for failed dam and tell Inuit what would happen below the dam if it were to break down*
- *Sylvia Grinnell was not supported in building hydro*
- *Speed of set-up is important (this person voted for wind)*
- *Burton Bay on the other side of the “long lake” has waterfalls and is significantly closer to town than any other proposed location*
- *Stay on this side of the Bay – too difficult to access year-round. Do not pump.*
- *Can you not study Jayne’s Inlet Wind + Hydro? Why must pumped storage have to happen? I think an undersea cable is the best idea*
- *I like Qasitjuak Lake Wind because we can start with something that has “lowest development time”— let’s trial it and expand.*



4.4 Recommendation of Preferred Alternative

The Kuugaluk River South Hydro alternative is the top ranking site in all of the weighted ranking scenarios. The strengths and advantages of the Kuugaluk River South option are numerous, including its renewable energy potential and its ability to be 'scaled up' as the demand in Iqaluit grows.

When QEC proposed Armshow River and Qigirrijaarvik as the preferred options in 2013, the message from the community was clear: while Qigirrijaarvik was deemed as acceptable, these regions would have an impact on traditional hunting practices and community land use. In other words,

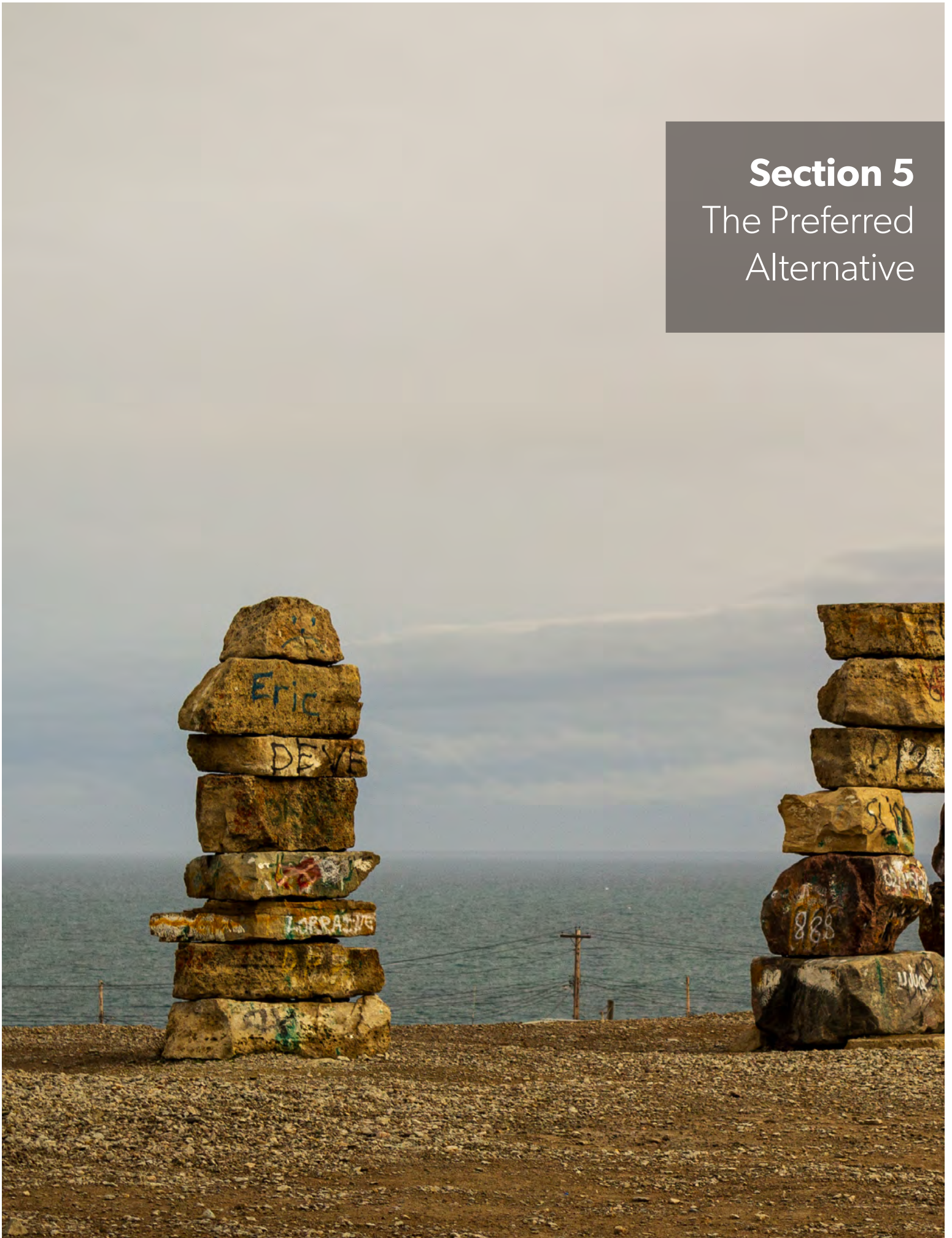
“Look somewhere else.”

We believe Kuugaluk River South is the 'somewhere else' that the community requested. This was confirmed through the community evaluation and feedback process.

The following sections will now focus on the Kuugaluk River South recommendation and the plan for its continued development.

Section 5

The Preferred
Alternative



5.0 Project Description

Kuugaluk South, the preferred renewable energy alternative identified from a comprehensive analysis of options, is a conventional hydroelectric facility located approximately 60 km northeast of Iqaluit on the Kuugaluk River, an unregulated watercourse which flows into Baffin Bay. A 50-year daily flow dataset was derived for Kuugaluk River South using records from Kuugaluk River North and the Sylvia Grinnell River. Integral features of the hydroelectric facility include the main dam and saddle dam(s) – both rockfill dams with sheet pile cores-, penstock, powerhouse, spillway, channels, access road, transmission lines, and various other elements. The sizing of the hydroelectric facility accounted for two different load configurations, namely:

- Electrical Load Only - Kuugaluk South Hydro: 15 MW, and
- Electrical, Thermal, & Industrial Load - Kuugaluk South Hydro: 30 MW.

With the goal of displacing between 70% to 100% of the chosen load while delivering the lowest LCOE, three storage scenarios for the main dam were reviewed: a small scenario, a medium scenario considered the “base” option, and a large scenario.

Attribute	Small	Medium (Base Case)	Large
Full Supply Level Elev. (m)	540	550	560
Flooded Area (km ²)	51	74	107
Total Storage (million cubic metre)	810,000	1,430,000	2,300,000
Dam Height (m)	38	48	58
# of Saddle Dams	0	1	3
Capacity Potential	15 MW	15-30 MW	30+ MW
Total Embankment Volumes (m ³)	600,000	1,080,000	3,250,000

Table 15 - Main Dam Options Summary

From a high-level review, it appears that a 15 MW hydropower system could be operated using inflows and storage from the main dam in isolation (i.e., no additional storage required); however, a 30 MW system would require additional inflow and/or water storage to operate at full capacity, full time. A second option includes the main dam as described, plus an upstream storage dam capable of providing the additional inflow required to operate a 30 MW system.

An expansion strategy of interest is the integration of wind through the Kuugaluk Rose Wind Plant. The strategy of wind integration is to reduce output from the hydropower plant when wind resources are available, ultimately retaining water and reducing the impacts of future low-water periods or droughts. The Kuugaluk Rose Wind Plant site is located on a rocky plateau adjacent to the Kuugaluk South access road and is notably very similar to the second-ranking alternative: Niaqunguk Wind. The wind plant would avail of Class 3 turbines with a capacity of 2 to 3.5 MW, and scenarios with wind capacity ranging from 0 MW to 40 MW have been analyzed.



Kuugaluk South Aerial View

5.1 Capital Cost

A concept level, class 5 cost estimate (-50% to + 100% accuracy) for the Kuugaluk South 15 MW hydroelectric “Base Case” scenario, is detailed in the following table, by project area.

Please note that costs will vary significantly as the concept matures, especially with the 15 MW v. 30 MW decision. These costs also do not take into account potential pairing with wind, or pumped storage – if either of these become components of the project, this cost estimate would change.

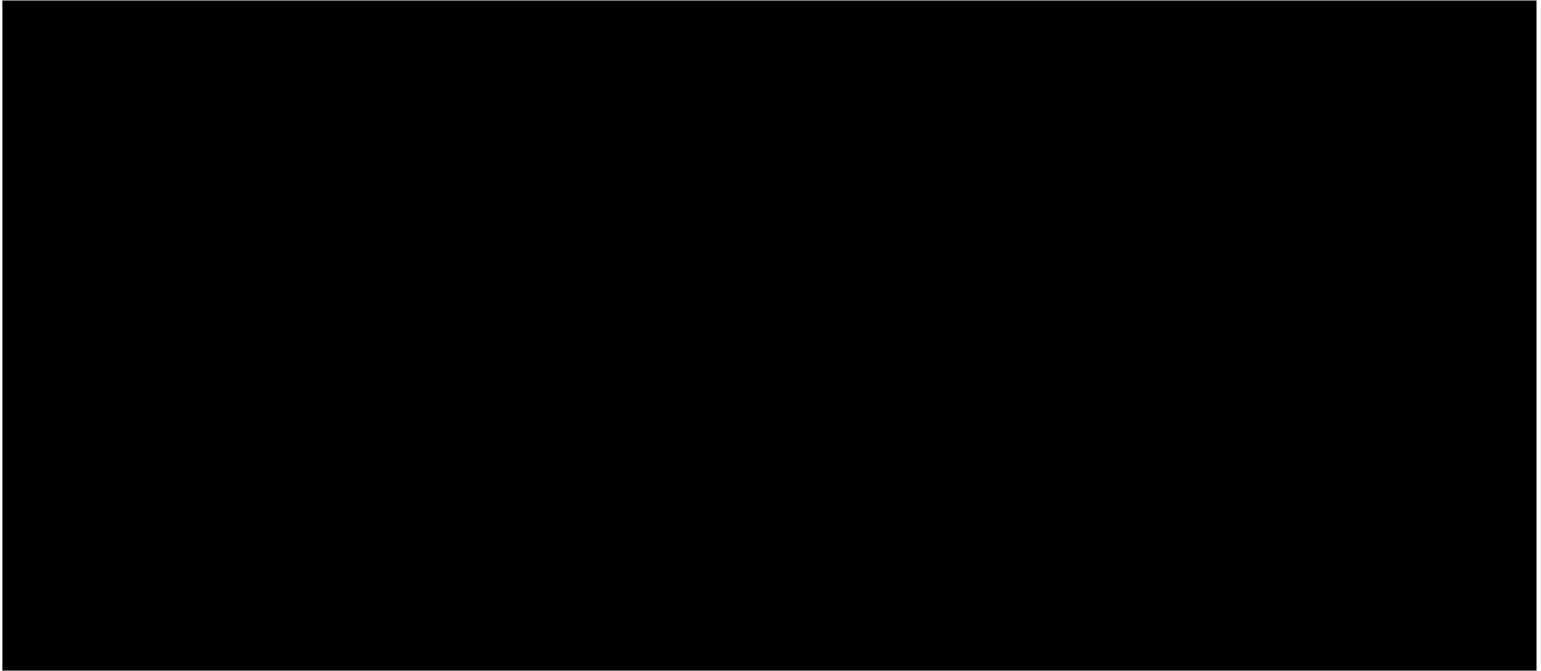


Table 16 - Kuugaluk South Capital Costs

5.2 Project Schedule

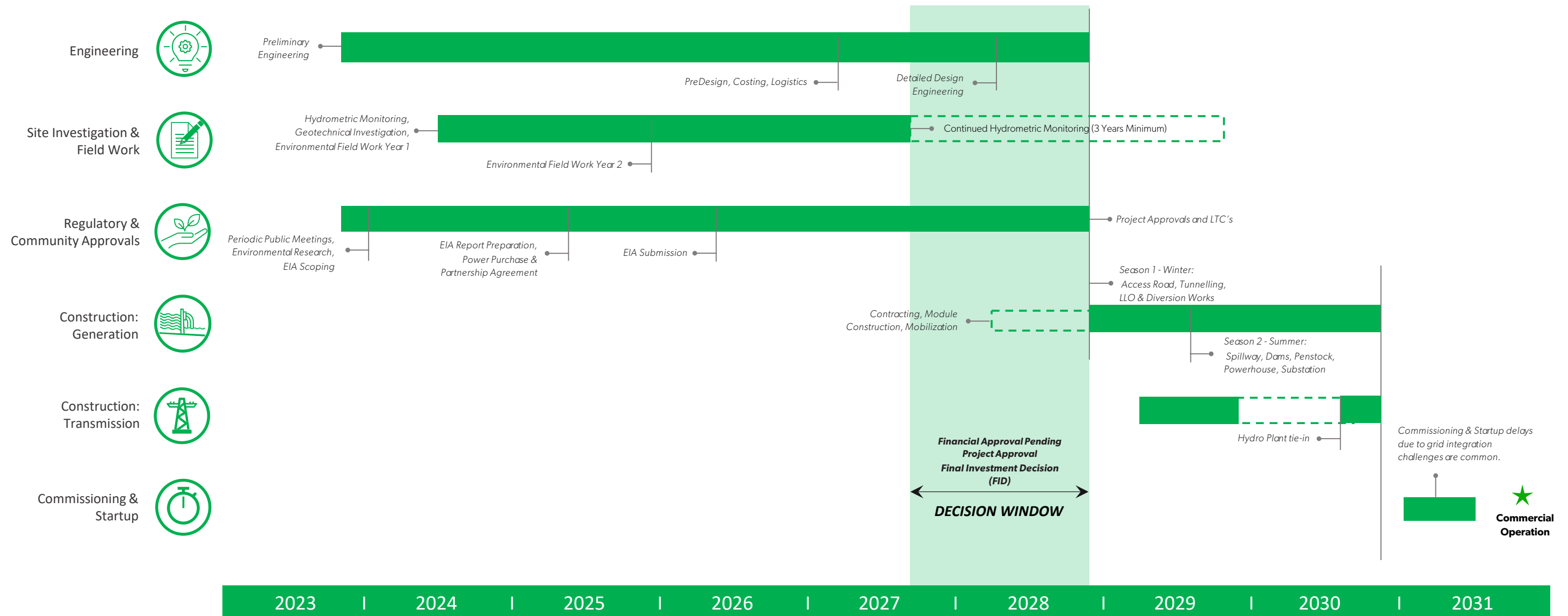
A preliminary schedule for Kuugaluk South has been established, setting the project duration from the end of Phase 2 to commissioning and commercial operation in Phase 5 at 7-8 years. The summer of 2024 is slated for the start of critical site investigations, including the commencement of hydrometric monitoring, site LIDAR surveying, environmental fieldwork, and geotechnical investigation. Key Phase 3 activities – including but not limited to detailed engineering, environmental and regulatory advancements, and contracting – will last approximately 24 to 36 months, with a final decision window between Q4 2025 and Q4 2026. Should the project pass through the Phase 3 gate, major construction will occur in the winter season of 2026 through the summer season of 2027, with the goal of commissioning and setup in early 2028. It should be noted that this preliminary schedule is subject to change as project development continues. Upon completion, the hydropower plant will have a minimum infrastructure life of 50 years and an expected useful life of 100 years.

Schedule strategy will be a key discussion point in early Phase 3; this will inform the project team’s approach to stakeholder and regulatory engagement.



ESTIMATED PROJECT TIMELINE

Iqaluit Nukkiksautiit Project



5.3 Project Economic & Financial Analysis

Throughout Phase 2 of the Iqaluit Nukkiksautiit Project, numerous scenarios were explored for the development of the Kuugaluk alternative. Given it is very early in the development process, it is imprudent to provide financial metrics such as internal rate of return, payback period, and return on invested capital at this time. Detailed financial metrics will be explored as the design is refined throughout the next phase of project development.

In the early stages of concept development, the team took the approach of comparing the LCOE of the current diesel system to the proposed renewable energy alternative. As a part of this activity, it was assumed that the Weighted Average Cost of Capital ("WACC") was 10% and that the project would target a 10% rate of return, both of which are standard practice in the renewable energy industry. The LCOE would then indicate the energy sales price required to achieve those returns. Please note that this is considered a conservative view; it is highly likely that the WACC for this project will be significantly less than 10%; for example, the Canada Infrastructure Bank's lending rate for this project would be 1%, representing a further reduction in LCOE.

Based on the Iqaluit Renewable Energy Alternatives Generation Report, it is understood by the Iqaluit Nukkiksautiit Project Team that the current cost of electricity supply to Iqalungmiut and Iqaluit industrial customers is approximately \$837/MWh. This is exorbitantly high, contributing to a lack of economic development and reduced access to opportunities for Iqalungmiut and Nunavummiut alike.

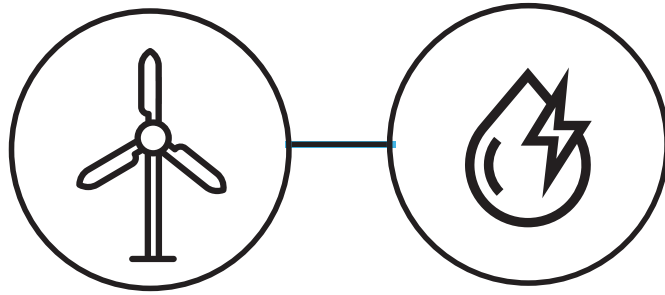
The anticipated range of LCOE for the Iqaluit Nukkiksautiit Project (factoring a 10% rate of return), based on the scenarios and capital cost ranges calculated through Power & Energy Models, is in the range of **\$235/MWh to \$601/MWh** with an expected value of nearly **\$350/MWh**. This represents a significant overall reduction in energy price from the current reality. It should also be noted that the economics are based on a 50-year design life, however, hydroelectric facilities commonly last longer than 100 years (further improving the returns on investments in this facility).

It is evident from the above LCOE expectations that there is a considerable opportunity to provide lower-cost, more reliable energy to Iqalungmiut while protecting the overall investment of the Iqaluit Nukkiksautiit Project. It is recommended that NNC continue to further explore this evident opportunity, refining the design parameters and cost estimates to gain more clarity on the true value of the opportunity.

More detailed, quantitative analyses will be completed throughout Phase 3 and will form part of the key deliverable before a final investment decision.

Financial Opportunity Iqaluit Nukkiksautiit Project

WIND + WATER HYBRID SYSTEM 10 MW - 30 MW

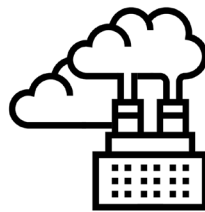


 **LCOE BETWEEN
\$235 & \$601
PER MWh ENERGY**



**ELIMINATES
15,000,000 L
DIESEL ANNUALLY**

 **TOTAL SAVINGS
\$1.6 BILLION
OVER PROJECT LIFE**



**40.2 MT CO₂e
ANNUAL EMISSIONS
REDUCTION**

5.4 Key Risks and Uncertainties

While the opportunity is clearly significant, it is important to note that major capital projects carry inherent risk, which must be managed properly. NNC acknowledges this. In addition to the phase-gate system, the following are envisaged to be additional risk mitigation measures that will be built into the project:

- 'Cold Eyes' Review of Decision Support Packages at each major decision gate;
- Involvement of international hydroelectric subject matter experts from LVP, a subsidiary of the national utility of Iceland, during the technical development of the project. LVP offers the unique perspective of both a designer and utility;
- Obtain external funding for the early phases of development, eliminating the risk of sunk cost;
- Early and ongoing engagement with Inuit Rightsholders and community members to ensure local collaboration in all project phases;
- Early adoption of project management and controls mechanisms consistent with the Project Management Body of Knowledge standards.

The establishment of project technical/execution risks will be captured and mitigated into Phase 3 and throughout development, but key strategic risks identified for Kuugaluk South include:

Kuugaluk South Risks (including significant assumptions)		
Risk	Initial Risk Rating	Proposed Mitigation Measures
EA / Regulatory Approvals Process (NIRB, etc.)	Medium	A regulatory strategy has been developed, with regulatory processes being investigated in SEM's Environmental & Regulatory Evaluation. Necessary research and fieldwork, report preparation, and approval timelines have been accounted for in the project schedule and will be a major point of focus in Phase 3.
Data Collection Delays	Low	Data collection will commence early, and members of the Project Team have collected this type of data for renewable energy projects in the past and thus have an appropriate understanding of the length of time and associated costs of doing so.
Community Opposition	Low	The execution and incorporation of the Tusaqtavut Study in early project development has allowed for early community involvement and has mitigated much of the potential community opposition. Ongoing community outreach and engagement events have resulted in overall positive feedback and support, but ongoing engagement and consultation remains a high priority in all project phases.
Load Identification	Low	Correctly identifying the appropriate load when sizing the project is important to avoid overbuilding or underbuilding. Mitigation measures include ongoing load modelling, data collection, and engagement with stakeholders. The scalability of this project decreases the rating of this risk.
Environmental Impacts	Medium	Project infrastructure environmental effects and mitigation measures have been detailed in SEM's Environmental & Regulatory Evaluation, with further work slated into Phase 3. Several construction innovations to reduce environmental impacts are being considered. Avoiding adverse environmental effects remains a high priority in project development and execution.
Schedule	Medium	An estimated detailed preliminary schedule has been established for the project and can be found in the Appendix. Mitigation measures include thorough risk identification within the schedule, contingency planning, regular schedule monitoring, and scenario planning with alternate schedules in anticipation of potential schedule disruptions.
Technical Uncertainty	Low	Technical uncertainties including a lack of geotechnical and hydrological data will be addressed by a number of site investigations slated for Phase 3. Ongoing engineering work and engagement with the project's technical partners will address other technical risks and uncertainties.
Financial/ Commercial Contracting	Low	Multiple financial routes may have to be pursued. PPA negotiations and agreement with QEC is absolutely a requirement for Phase 3

Table 17 - Kuugaluk South Risks and Mitigation Measures

A caracal is sitting on a grassy hill, looking towards the right. The sky is a uniform grey. The foreground is filled with dry, brownish grass and some small plants. The caracal has a light brown coat with darker spots on its chest and neck.

Section 6

Plan for Phase 3

6.0 Phase 3 Activities

The project team will, pending Gate 2 approval, proceed to Phase 3 in 2024. A key theme of the 2023-2024 fiscal year will be preparation and execution of data collection to inform design decisions. This data will include geotechnical investigations, multi-year hydrological modelling based on in-stream data, and environmental baseline studies. While the schedule for these activities will be dictated by permitting timelines, the goal is to reach initial Project Registration Document preparation by mid 2024. Please note that this is not expected to represent the end of the detailed design phase, but it will trigger the regulatory review process, which is a significant milestone to the project.

6.1 Project Management Activities

Standard project management and project controls practices will continue through Phase 3. In addition to standard activities, the project team will begin to develop commercial and financing strategies for the construction phase. This will include evaluation of partnership and financing options (for example, Canada Infrastructure Bank financing options) based on the company's acceptable risk tolerances. Recommendations for financing and partnership will be presented at the end of the 2023-2024 fiscal year.



6.2 Technical Development - Civil

The next step is to ensure the detailed design for Kuugaluk River South is informed by strong data sets. This is of particular importance for hydroelectric projects, where geotechnical data is, by far, the greatest source of uncertainty and cost risk on a project. Early in-depth definition is paramount to project success and is, thus, a key focus from the outset. The data collected will be used for: modelling permafrost and hydrogeological/groundwater flows, understanding the surficial deposits and rock structures, assessing constructability, and identifying sources and suitability of earthworks materials at each site. Please note that the number/extent of these investigations required will depend on the site of the selected alternative. The exact plan will be refined early in Phase 3.

Data investigations may include:

Hydrology. Phase 2 analysis has been based on limited hydrological data for the watershed. A critical activity for Phase 3 is the collection of hydrological data within the Kuugaluk South watershed that will help to reduce the design uncertainty for long term hydrological sequences used to estimate overall power and energy output and reservoir characteristics.

Survey. Geological, geotechnical, and geomorphological surveys will comprise professional staff walking a pre-planned route to obtain: geotechnical data about ground conditions including photographs; geological, geotechnical, and geomorphological mapping; measurement of rock discontinuity orientations using a geological compass; and, examination of the rock with a geological hammer. The survey is intended to characterize ground conditions and identify areas of slope instability, or other geohazards that could affect the reservoir. Data collected from the DeBeers project is turning out to be a major benefit. Data relevant to this project is actively being collected from their hydrometric stations.

LiDAR and Photogrammetry. Detailed site topography, including reservoir footprint, will be captured using a mix of land-based LiDAR scanning, drone-based LiDAR capture, and photogrammetric digital elevation model capture. This will allow us to target features for additional exploration techniques while maintaining a minimalist footprint on the sites.

Geophysics. Surface based non-invasive geophysical methods such as seismic refraction and resistivity surveys may be undertaken across the river channels or other landforms as required.

Seismic Refraction. Seismic refraction surveys are conducted by initiating ground seismic waves using a hammer or small explosive charge and measuring seismic waves velocities through the different types of soil or rock. Waves are refracted when they cross the boundary between different types (or conditions) of soil or rock. The survey enables the general soil types and the approximate depth to strata boundaries, or to bedrock, to be determined.

Ground Resistivity. Ground resistivity testing would be conducted using a Wenner 4-point test in accordance with IEEE Standard 81. The test involves driving probes in the ground in a straight line and passing a known electrical current through the end probes and measuring the resistance between the probes.

Drilling. Geotechnical diamond drill boreholes 96 mm in diameter will be progressed into rock using a HQ3 wireline drill. The depth of the boreholes depends on the site and location. Some boreholes will be progressed through the permafrost into the basal cyropeg and into the sub-permafrost. Chilled brine drilling fluid (below 0°C) will be used to collect permafrost overburden samples and to capture the ice entrained in the bedrock. On completion the boreholes will be backfilled with stable cement grout to the surface. The drill and accompanying equipment will need to be situated on level pads, likely of timber construction. The equipment and materials for creation of the pads and access during drilling will be via helicopter. The drilling will capture 62 mm diameter rock cores that will be logged at surface before being placed into core boxes. Core boxes will be transported to and stored in Iqaluit. Core samples will be retrieved from the storage facility as required and sent to the laboratory for testing.

Televiewer Survey. Each borehole will undergo a televiewer survey. The televiewer is a geotechnical tool that logs the rock forming the walls of the borehole. An optical tool will visually assess the rock, and an acoustic tool will use acoustic waves to measure the distance from the televiewer to the borehole wall in a fluid-filled borehole. Both surveys combined will allow the discontinuities of the rock fabric intercepting the borehole wall to be measured in both dip and dip direction. Additional downhole geotechnical / geophysical televiewer borehole probes may be used if determined to be appropriate.

Hydraulic Conductivity Testing. Holes will undergo water pressure testing using two packers to isolate a section of borehole. Water will be pumped into the isolated section at a given pressure and the flow rate recorded. The data is then used to calculate the hydraulic conductivity of the rock.

Ground Water Level. Vibrating wire piezometers will be installed at various depths in the boreholes to measure ground water pressures. When combined with data loggers these will record ground water fluctuations over time. An above ground metallic cover will be installed for future identification and protection of the data logger.

Temperature Profile. Ground temperature cables will be installed in boreholes at various depths in the borehole to give an understanding of the thermal profile of the ground and how it changes over time relative to the temperature on the surface.

Test Pits. Test pits, if required, will be hand dug in alluvial deposits to obtain material for bulk samples for particle size analysis and to attempt to identify the structure of the deposit. Approximately 30 kg of material will be collected per test pit.

Bathymetric Survey. Where bathymetric surveys are required, equipment will be towed behind a gasoline powered Zodiac type boat. It is anticipated that the survey will require up to three days per body of water.

Data inputs will inform follow-on design activities, including preliminary design, layout, technical and cost refinement. This will be summarized in a Pre-Design Report.

Later phase activities will include detailed design, including design basis, drawing and specification development. Deliverables will include design basis and, ultimately, Issued For Tender (“IFT”) level contract packages.

6.3 Technical Development - Electrical

Key electrical studies for the Kuugaluk South concept will be developed in-parallel to the civil scope. As an initial step, transmission and station options (i.e., voltage, length, configurations, etc.) will be narrowed down in alignment with the electrical design basis. Protection & control schemes will be refined as the preferred reliability model is understood and agreed to (ideally) with the utility. Preliminary transmission line routing will be selected so that line length, conductor size and type can be selected.

A key Phase 3 activity will be the development of the Electrical Transient Analyzer Program (“ETAP”) system simulation model. This is the base model that we would build on as the design evolves and would form the basis of any carry-on engineering studies, such as short circuit, load flow, stability, etc. Initial meetings with QEC technical staff indicate good support for collaboration and data-sharing – QEC are, as of February, 2024, working on compiling data sets in response to project team requests. Ideally, the project team will build off of existing utility models, but it is possible that the ETAP model will have to be built as a new file, depending on data quality.

6.4 Environment & Regulatory

Previous studies for renewable energy development are more than 10 years old and, consequently, require re-baselining of most (if not all) environmental data. Like the technical scope, early phase 3 activities will focus on data collection and closing some of these information gaps that are critical to decision making, design and regulatory compliance. The following is a summary of the information to be compiled for environmental baseline studies.

The project team will prioritize the draft of the Project Registration Document. This will be subject to permitting timelines and approvals.

- Summary of Biophysical Environment
- Air Quality, Climate and Meteorology
- Noise and Vibration
- Terrestrial Environment
- Geological Features, Surficial and Bedrock Geology and Geochemistry (also in civil scope)
- Hydrological Features and Hydrogeology (also in civil scope)
- Groundwater and Surface Water Quality
- Sediment Quality
- Freshwater Aquatic Environment
- Marine Environment
- Vegetation
- Terrestrial Wildlife and Wildlife Habitat
- Birds and Bird Habitat

The following table outlines the key permits required prior to the advancement of data collection activities. The acquisition of permits will be a key driving factor of schedule in Phase 3.

Agency	Enabling Legislation	Authorization	Agency Review
NPC	Nunavut Planning and Project Assessment Act (S.C. 2013, c. 14, s. 2)	Conformity Determination	45 days
NIRB		Screening Decision / Project Certificate	45 days – 2 years (likely 45 days)
NWB	Nunavut Waters and Nunavut Surface Rights Tribunal Act (S.C. 2002, c. 10)	Water License (likely Class B but may be Class A)	3 months
CIRNAC	Territorial Lands Act (R.S.C., 1985, c. T-7)	Crown Land Use Permit (may be Class A or Class B)	42 days
GN CGS	Commissioner's Land Act	Commissioner's Land Use Permit	30-60 days
City of Iqaluit	Nunavut Cities, Towns, and Villages Act	Development / Building Permit	TBD
QIA	Nunavut Land Claims Agreement (1992)	IOL Access Permit (may be Land Use Licence, Commercial Lease, and/or Right-of-Way Agreement)	TBD
NRI	Consolidation of Scientists Act (R.S.N.W.T. 1988, c. S-4)	Scientific Research License	120 days – 1 year (likely 120 days)
GN DOE	Consolidation of Wildlife Act (S.Nu. 2003, c. 26)	Wildlife Research License	60-70 days
		Nunavut Territorial Parks Use Permit	
DFO	Fisheries Act (R.S.C., 1985, c. F-14)	Experimental Fishing License (S52 License)	30 days
ECCC	Permits Authorizing an Activity Affecting Listed Wildlife Species Regulations (SOR/2013-140)	Species at Risk Act (SARA) Permit - Scientific Research	TBD
	Migratory Birds Regulations (SOR/2022-105)	Migratory Bird Handling Permit	TBD
GN CLEY	Nunavut Archaeological and Palaeontological Sites Regulations (SOR/2001-220)	Archaeology and Palaeontology Permit	TBD

Table 18 - Permits

6.5 Community & Stakeholder Engagement

Community engagement will continue to be a focal point of the project; it is expected the Inuit Advisory Committee established in Phase 2 will continue to provide guidance to the project team and the direction of the project. The project team will meet with Rightsholders and stakeholders in intervals laid out in the Community & Stakeholder Engagement Plan (IQA-COE-RP-002). Permitting and regulatory engagement will be a key stakeholder engagement activity in Phase 3. Additionally, it is expected that QIA, as a follow-on to the Tusaqtavut study, will commence with Inuit Qaujimagatuqangit studies, focusing on the assessment and application of ISV in the project's development. Please note that it is anticipated that the project's Inuit Advisory Committee will be a key interface with QIA during this activity.

6.6 Phase 3 Cost

The Kuugaluk site has the highest development potential, but is an area that has not been heavily studied to-date. Phase 3 is, therefore, defined by significant field data collection campaigns for both technical and environmental baseline studies. The table below is a current estimate until the end of financial year of 2025-2026.

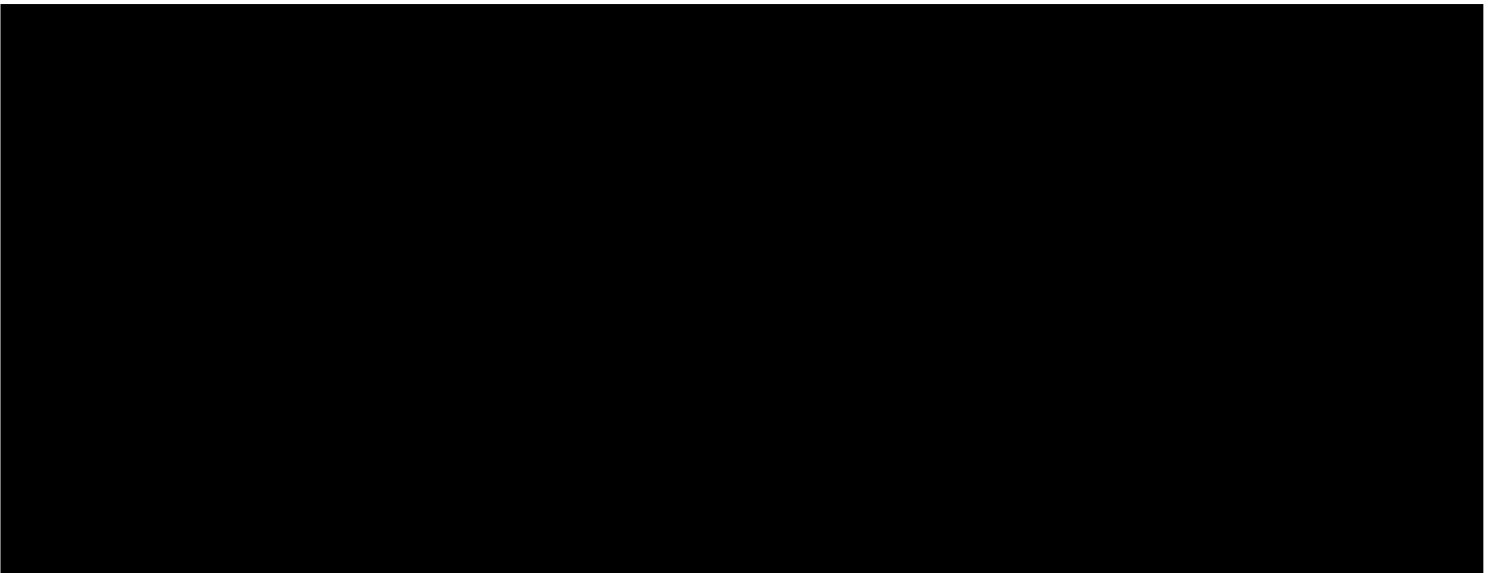


Table 19 - Phase 3 Cost

A Note on Funding & Financing Strategy Through Phase 3

The Iqaluit Nukkiqsautiit Project represents an opportunity to displace up to one third of Nunavut’s diesel consumption for electricity needs. This aligns with both federal objectives, and the recent commitments of the COP28 nations to reduce emissions by displacing fossil fuel usage in energy/electricity systems.

For this reason, it is believed that Phase 3 can be predominantly advanced through funding, and through financing options that allow for the advancement of front-end engineering capital as a risk-free loan. The graph below details the current view of funding and funding strategy for Phase 3. **In short, there are no funds requested by NNC from QC at this time; the project team will seek and secure funds as a part of Phase 3 activities.**

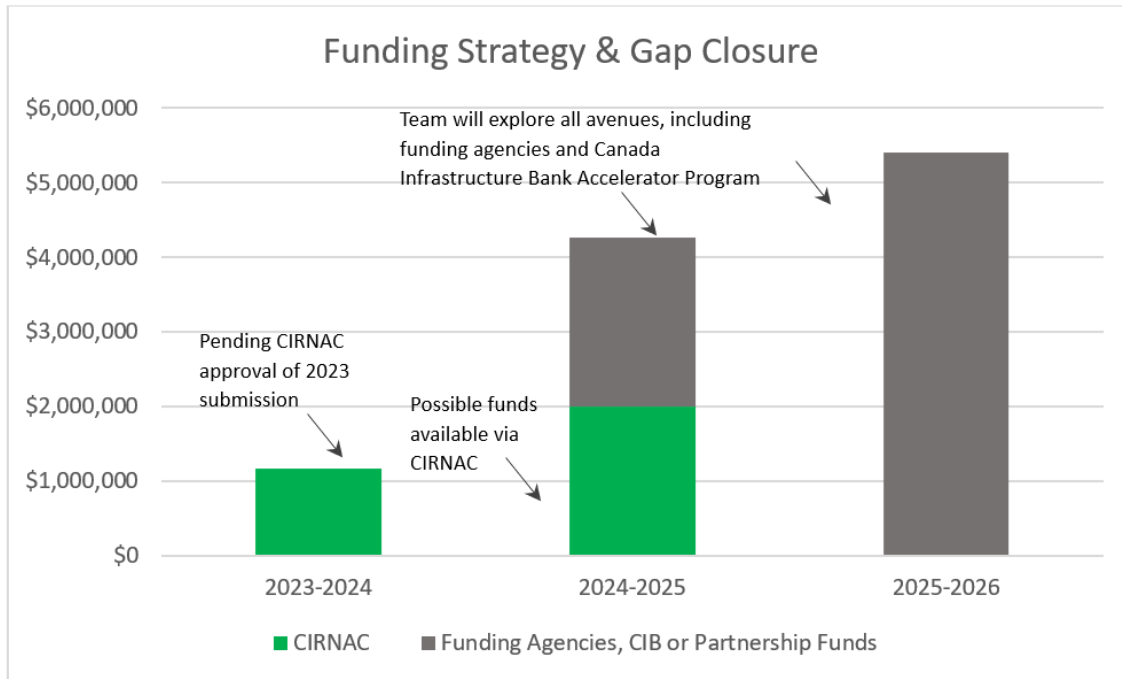


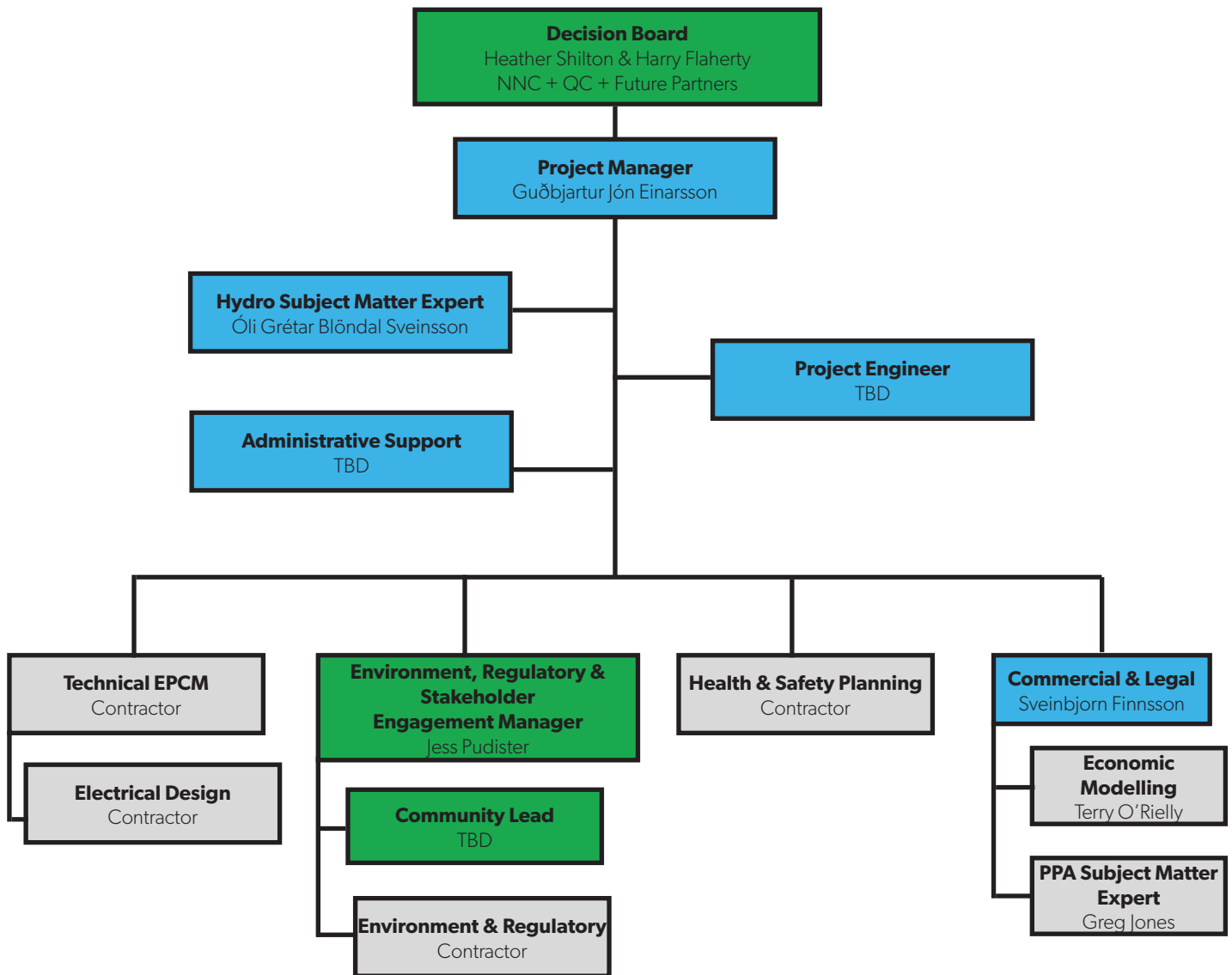
Figure 16 - Funding Strategy & Gap Closure

A Note on Partnerships and Commercial Structure

Hydroelectric projects, when executed effectively, are stable, profitable, long term investments. Historically, hydroelectric projects have been prone to cost overruns and financial risk, mainly due to the significance of the geotechnical uncertainty and extent of civil works. The single greatest strategy to mitigate this financial risk to hydroelectric development is the involvement of an experienced partner.

NNC proposes to explore partnership arrangements as a Phase 3 activity and will recommend a preferred partnership structure in 2024-2025. As illustrated in the following section, expertise from LVP, a subsidiary of the National Utility of Iceland, will be incorporated into the Phase 3 organization.

6.7 Organizational Chart



A landscape photograph of a fjord. In the foreground, there is a dirt road and a small pond. The middle ground features a large body of water, likely a fjord, surrounded by steep, dark mountains. The background shows more distant mountains under a cloudy sky. The text "Section 7 Approvals of Recommendation" is overlaid in the top right corner.

Section 7
Approvals of
Recommendation

7.0 Authorization to Proceed Request

Approval for the Iqaluit Nukkiksautiit Project to progress to Phase 3 is requested, given:

1. The Kuugaluk South alternative is the preferred concept, supported by project analysis and community feedback.
2. Phase 3 project funding has been obtained, mitigating the financial risk of progressing.
3. The Project Team has been established and prepared, Phase 3 can proceed with adequate, and capable, staffing.

Commitment is formally made by completion of the tables below. The signatures below represent acknowledgement of this document and authorization by the named Approvers, on behalf of the respective partners, to proceed with the Iqaluit Nukkiksautiit Project Phase 3 as described in this document.

Name / Position / Company	Signature	Date
Heather Shilton Director, Nunavut Nukkiksautiit Corporation		March 7, 2024
Harry Flaherty CEO, Qikiqtaaluk Corporation		March 7, 2024
Olayuk Akesuk President, Qikiqtani Inuit Association		March 21st, 2024

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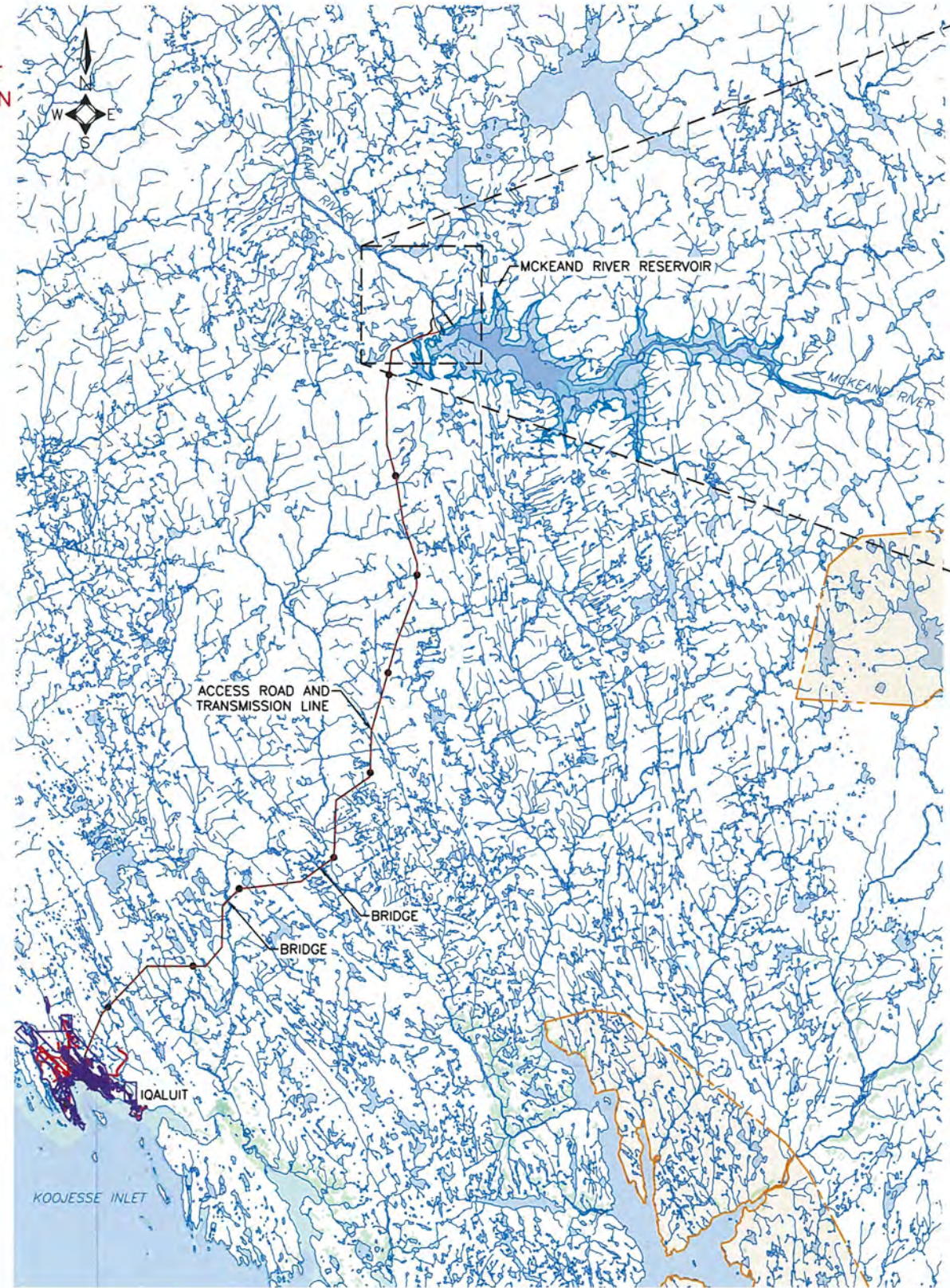
APPENDIX 'A'

Technical Drawings

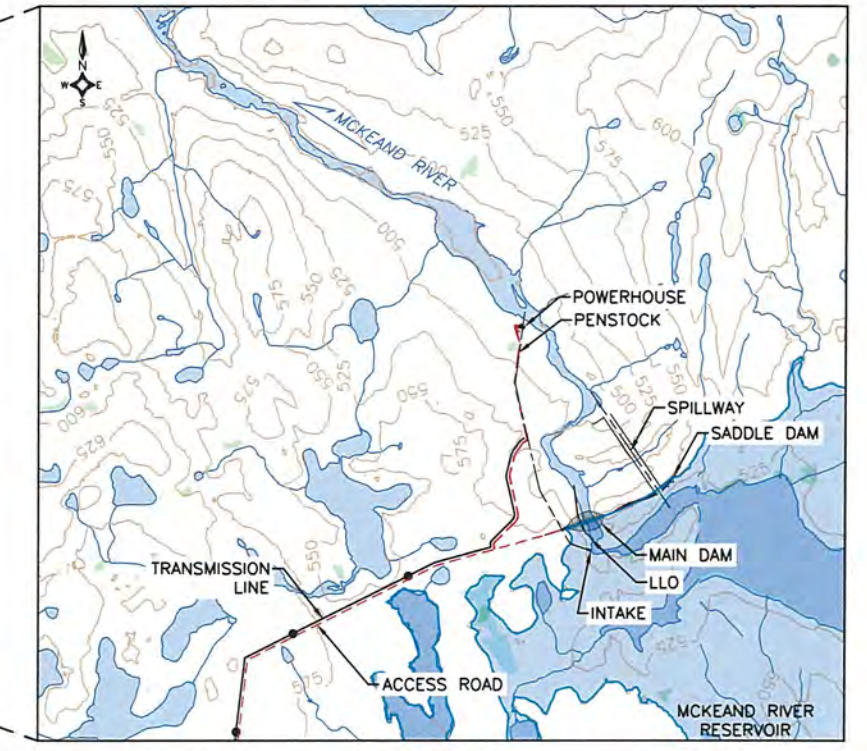
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REGIONAL PLAN
NTS



AREA PLAN
NTS



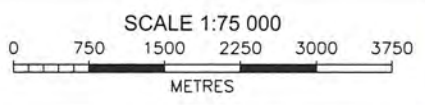
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5. VERTICAL DATUM: WGS84 ELLIPSOID.

LEGEND

- PENSTOCK
- NEW ROAD
- TUNNEL
- FSL
- LSL
- INUIT OWNED LANDS
- WOODED AREA
- NORMAL WATER
- PROPOSED RESERVOIR
- INTERMITTENT WATER
- TRANSMISSION LINE



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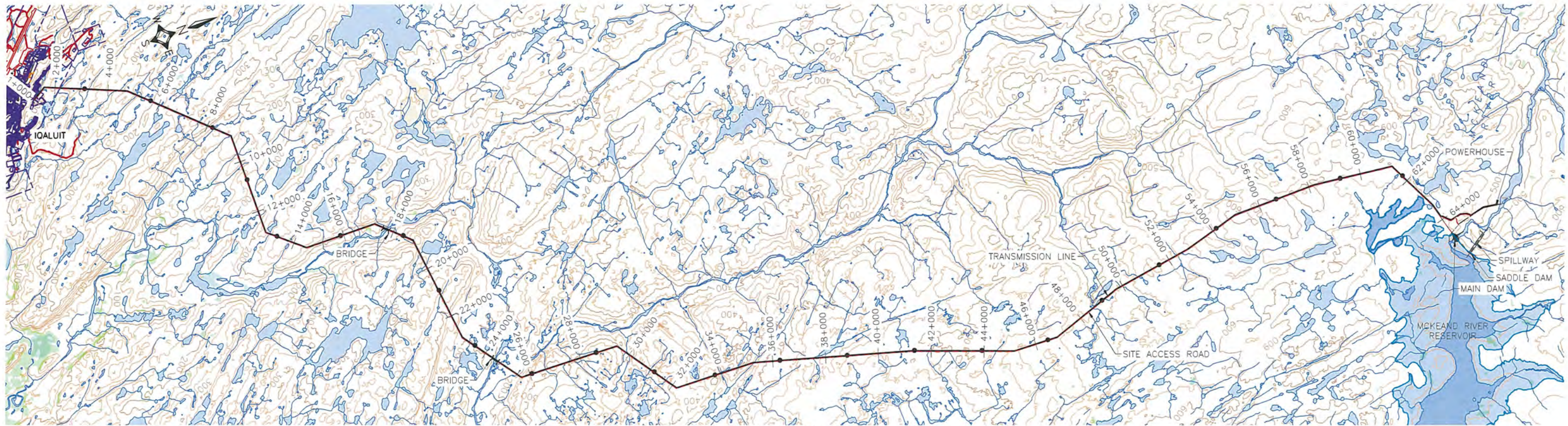
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GROWLER ENERGY
MCKEAND RIVER SOUTH PROJECT
GENERAL - PROJECT
PROJECT LOCATION
PLANS

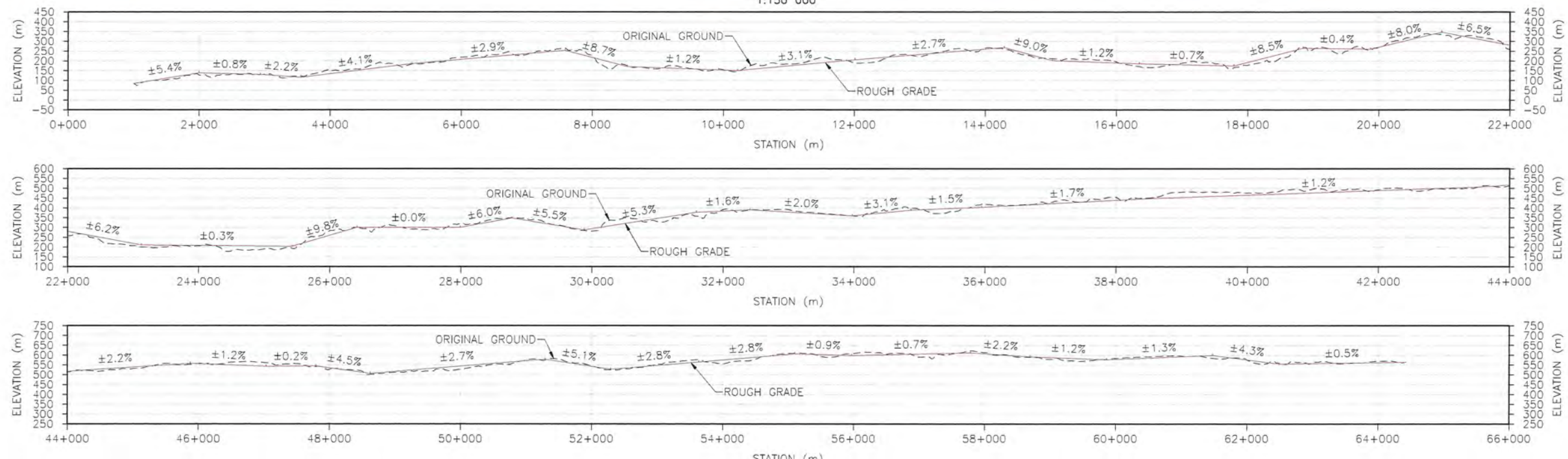
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CADD NUMBER	4.3.038
DRAWING NUMBER	551

A TETRA TECH COMPANY

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PLAN - ROAD
1:150 000



PROFILES - ROAD
H 1:75 000
V 1:25 000

NOTES

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LEGEND

- PENSTOCK
- - - NEW ROAD
- - - TUNNEL
- FSL
- LSL
- INUIT OWNED LANDS
- WOODED AREA
- NORMAL WATER
- PROPOSED RESERVOIR
- INTERMITTENT WATER
- TRANSMISSION LINE



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MCKEAND RIVER SOUTH PROJECT
GENERAL - PROJECT
SITE ACCESS
PLAN AND PROFILES

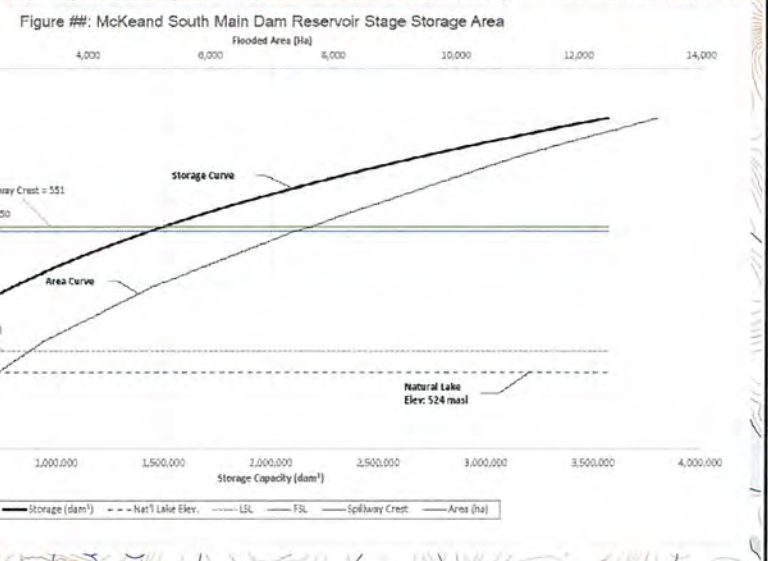
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 5. VERTICAL DATUM: WGS84 ELLIPSOID.

- LEGEND**
- PENSTOCK
 - - - NEW ROAD
 - TUNNEL
 - FSL
 - LSL
 - INUIT OWNED LANDS
 - WOODED AREA
 - NORMAL WATER
 - PROPOSED RESERVOIR
 - INTERMITTENT WATER
 - TRANSMISSION LINE



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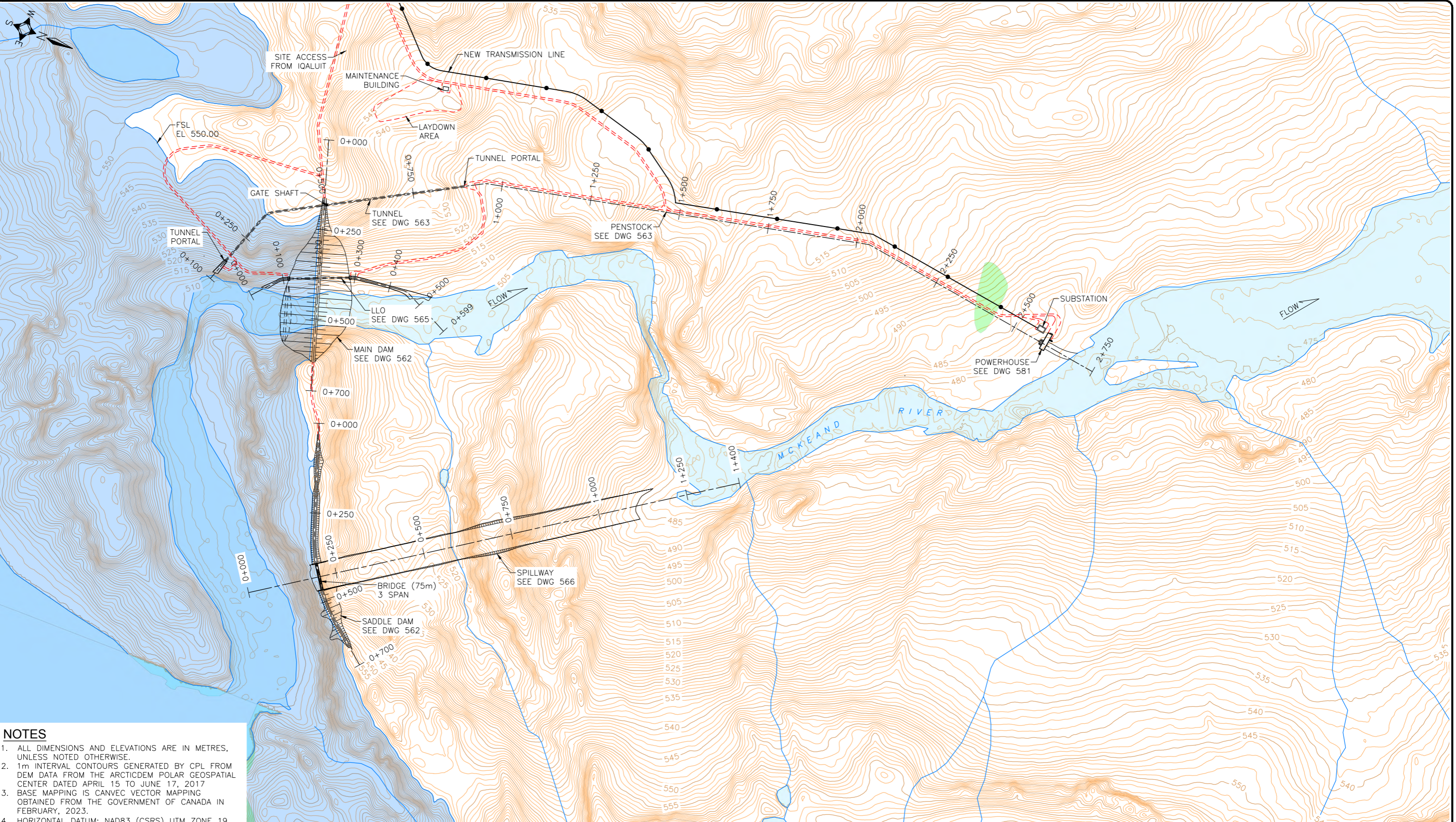


GROWLER ENERGY

MCKEAND RIVER SOUTH PROJECT
GENERAL - PROJECT
HEADPOND
PLAN

PROJECT NUMBER	1096-006
CADD NUMBER	4.3.037
DRAWING NUMBER	553

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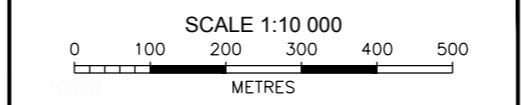
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- LEGEND**
- TUNNEL/PENSTOCK
 - - - NEW ROAD
 - FSL
 - LSL
 - INUIT OWNED LANDS
 - WOODED AREA
 - NORMAL WATER
 - PROPOSED RESERVOIR
 - INTERMITTENT WATER
 - TRANSMISSION LINE



PERMIT TO PRACTICE

ENG STAMP



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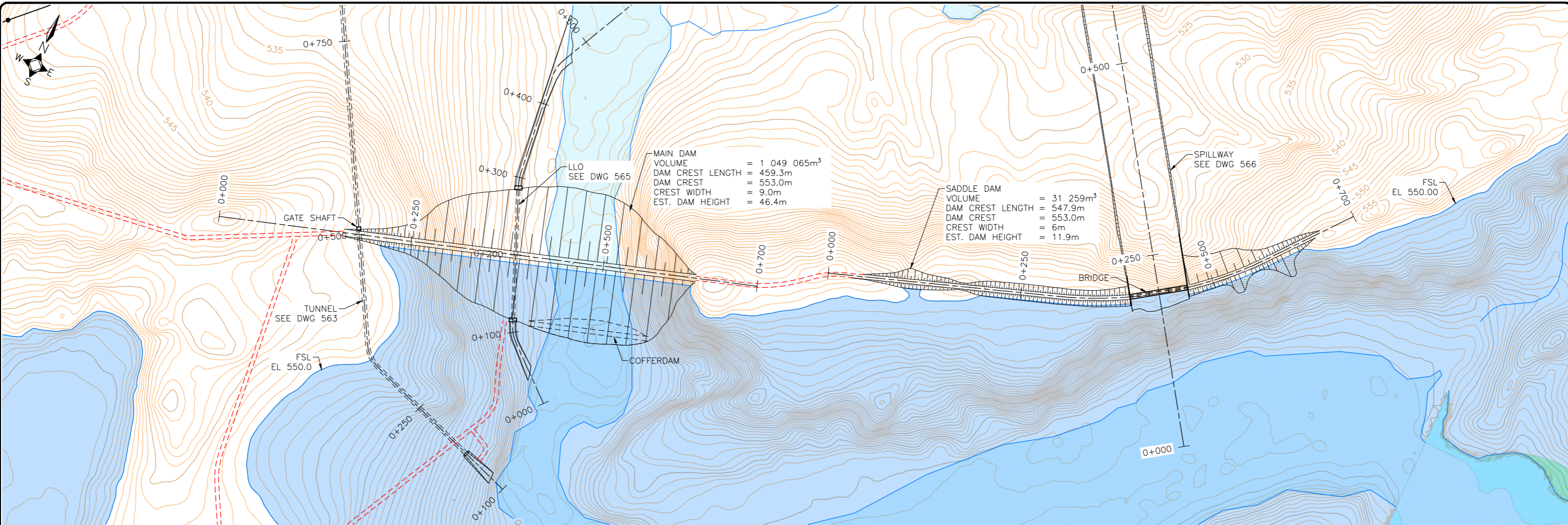
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GROWLER ENERGY

MCKEAND RIVER SOUTH PROJECT
GENERAL - PROJECT
OVERALL AREA
PLAN

PROJECT NUMBER	1096-006
CADD NUMBER	4.3.036
DRAWING NUMBER	561

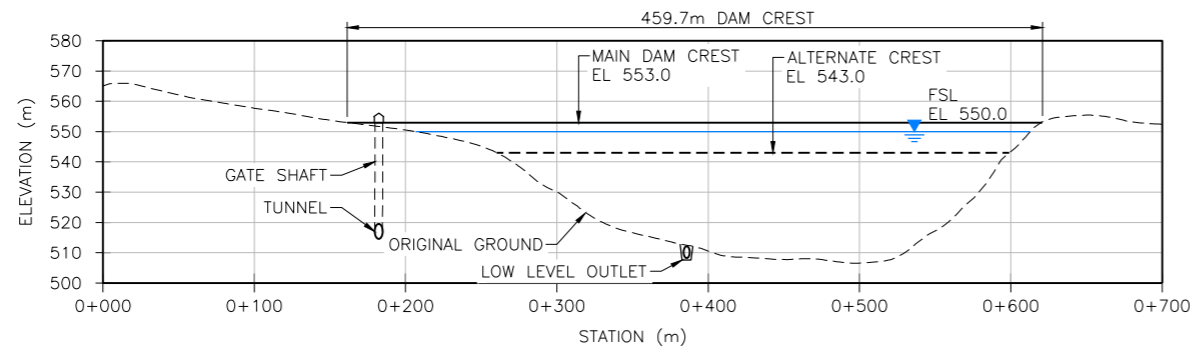
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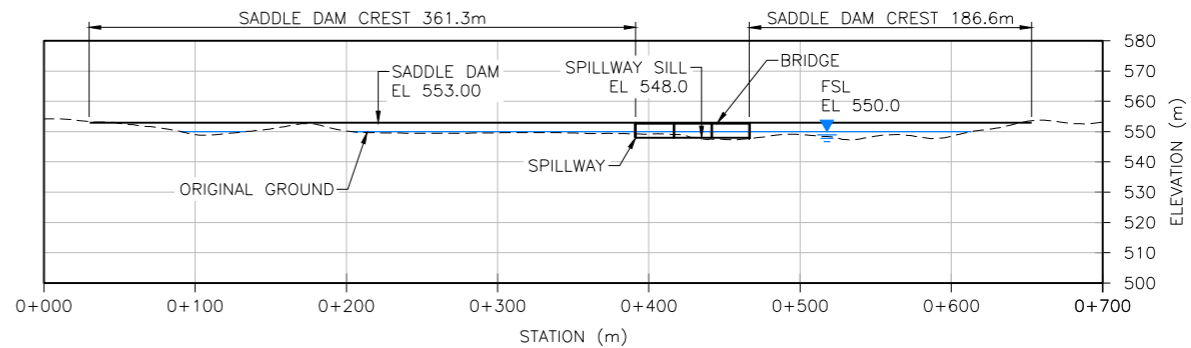
PLAN
1:5000

MAIN DAM
 VOLUME = 1 049 065m³
 DAM CREST LENGTH = 459.3m
 DAM CREST = 553.0m
 CREST WIDTH = 9.0m
 EST. DAM HEIGHT = 46.4m

SADDLE DAM
 VOLUME = 31 259m³
 DAM CREST LENGTH = 547.9m
 DAM CREST = 553.0m
 CREST WIDTH = 6m
 EST. DAM HEIGHT = 11.9m



PROFILE - MAIN DAM
 H 1:5000
 V 1:2500



PROFILE - SADDLE DAM
 H 1:5000
 V 1:2500

NOTES

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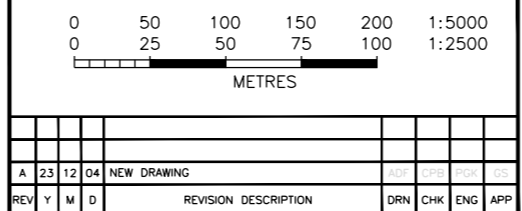
LEGEND

- TUNNEL/PENSTOCK
- - - NEW ROAD
- - - FSL
- - - LSL
- INUIT OWNED LANDS
- WOODED AREA
- NORMAL WATER
- PROPOSED RESERVOIR
- INTERMITTENT WATER
- TRANSMISSION LINE



PERMIT TO PRACTICE

ENG STAMP



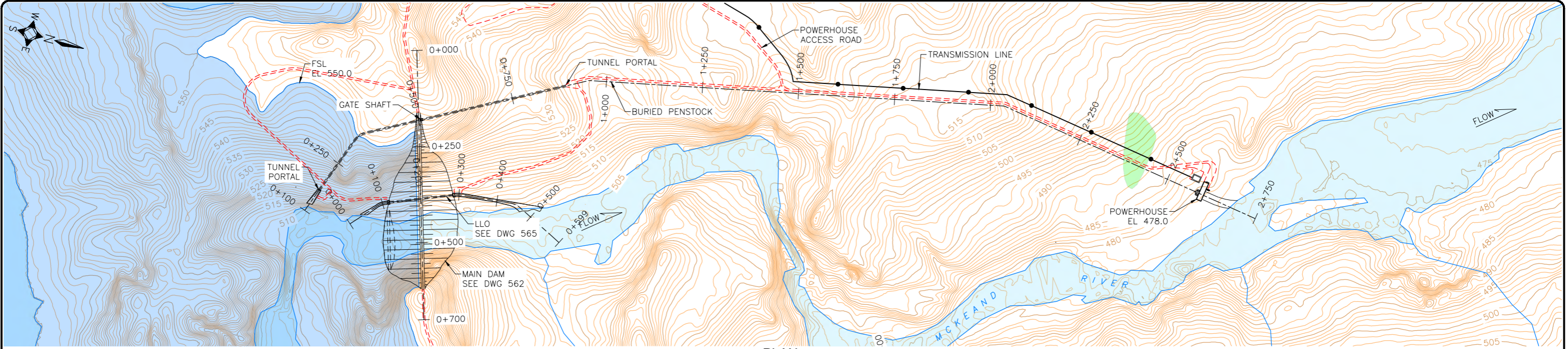
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GROWLER ENERGY

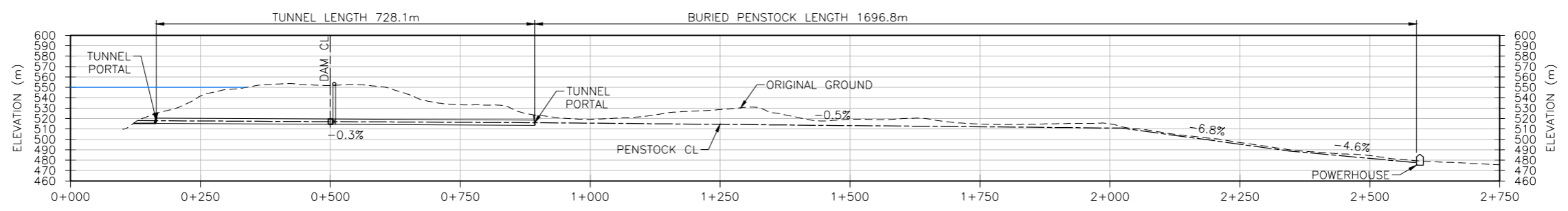
MCKEAND RIVER SOUTH HYDRO
 GENERAL - PROJECT
 MAIN DAM & SADDLE DAM
 PLANS & PROFILES

PROJECT NUMBER	1096-006
CADD NUMBER	4.3.036
DRAWING NUMBER	562

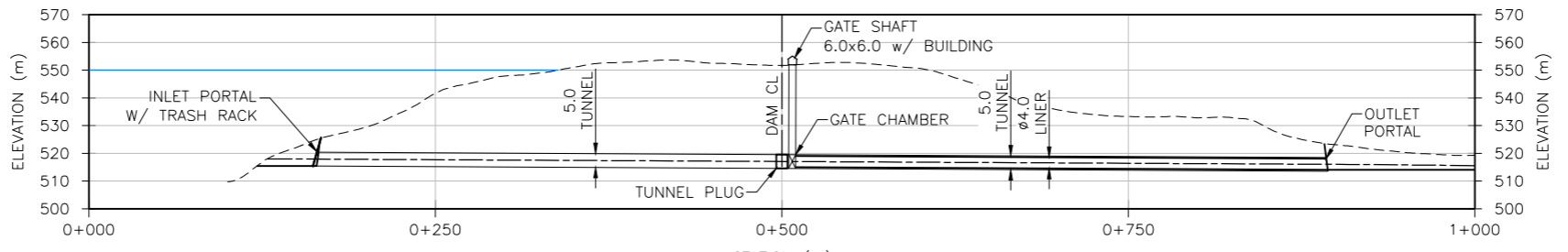
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PLAN
1:10 000



PROFILE - PENSTOCK
H 1:10 000
V 1:5000



PROFILE - TUNNEL
H 1:5000
V 1:2500

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- LEGEND**
- TUNNEL/PENSTOCK
 - NEW ROAD
 - FSL
 - LSL
 - INUIT OWNED LANDS
 - WOODED AREA
 - NORMAL WATER
 - PROPOSED RESERVOIR
 - INTERMITTENT WATER
 - TRANSMISSION LINE



PERMIT TO PRACTICE

ENG STAMP

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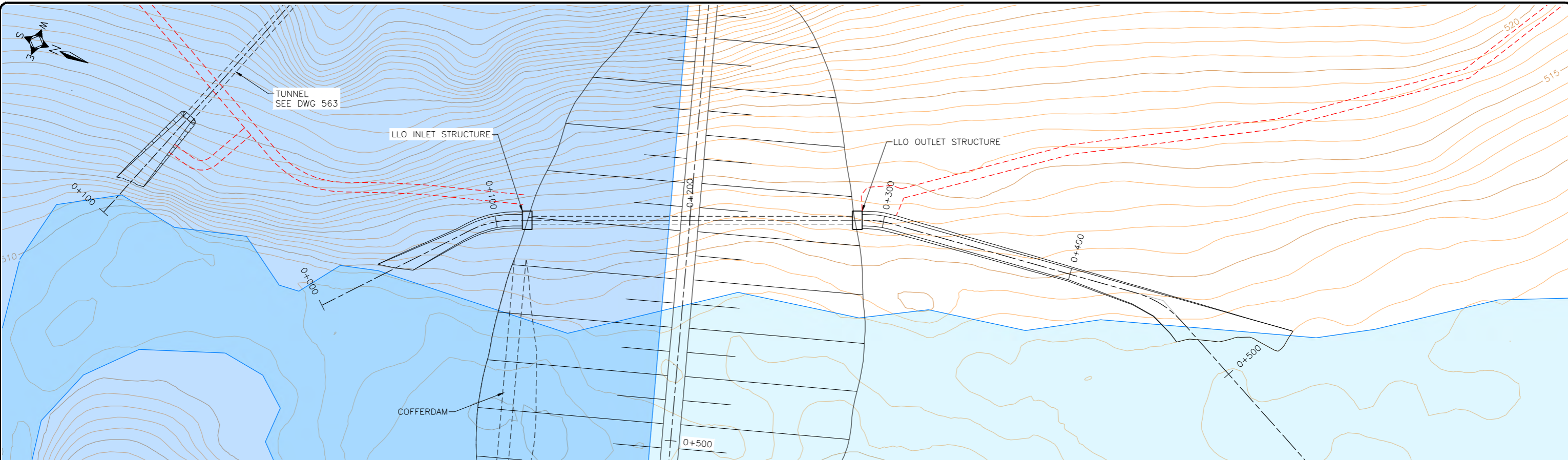
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GROWLER ENERGY

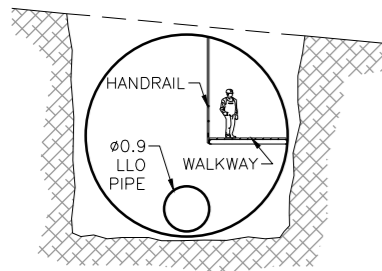
MCKEAND RIVER SOUTH HYDRO
GENERAL - PROJECT
TUNNEL & PENSTOCK
PLAN & PROFILES

PROJECT NUMBER	1096-006
CADD NUMBER	4.3.036
DRAWING NUMBER	563

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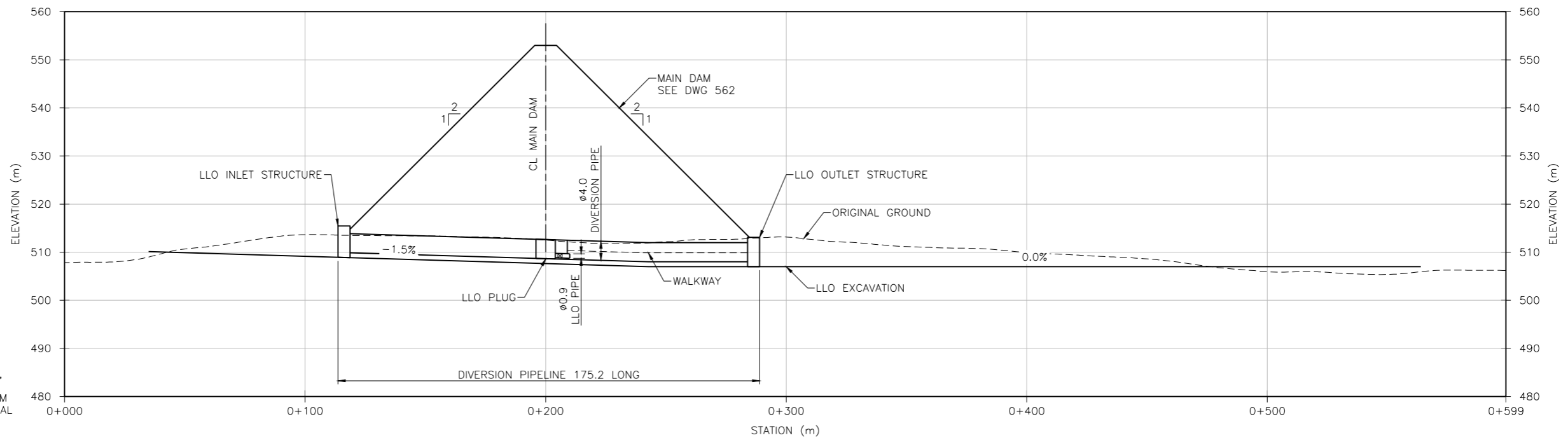
Ø4.0 DIVERSION PIPE - SECTION

NOTES

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
2. 1m INTERVAL CONTOURS GENERATED BY CPL FROM DEM DATA FROM THE ARCTIDEM POLAR GEOSPATIAL CENTER DATED APRIL 15 TO JUNE 17, 2017
3. BASE MAPPING IS CANVEC VECTOR MAPPING OBTAINED FROM THE GOVERNMENT OF CANADA IN FEBRUARY, 2023.
4. HORIZONTAL DATUM: NAD83 (CSRS) UTM ZONE 19.
5. VERTICAL DATUM: WGS84 ELLIPSOID.

LEGEND

- TUNNEL/PENSTOCK
- - - NEW ROAD
- FSL
- - - LSL
- INUIT OWNED LANDS
- WOODED AREA
- NORMAL WATER
- PROPOSED RESERVOIR
- INTERMITTENT WATER
- TRANSMISSION LINE



PROFILE
H 1:2000
V 1:1000

PRELIMINARY - NOT FOR CONSTRUCTION

GROWLER ENERGY

MCKEAND RIVER SOUTH HYDRO
GENERAL - PROJECT
LOW LEVEL OUTLET
PLAN & PROFILE

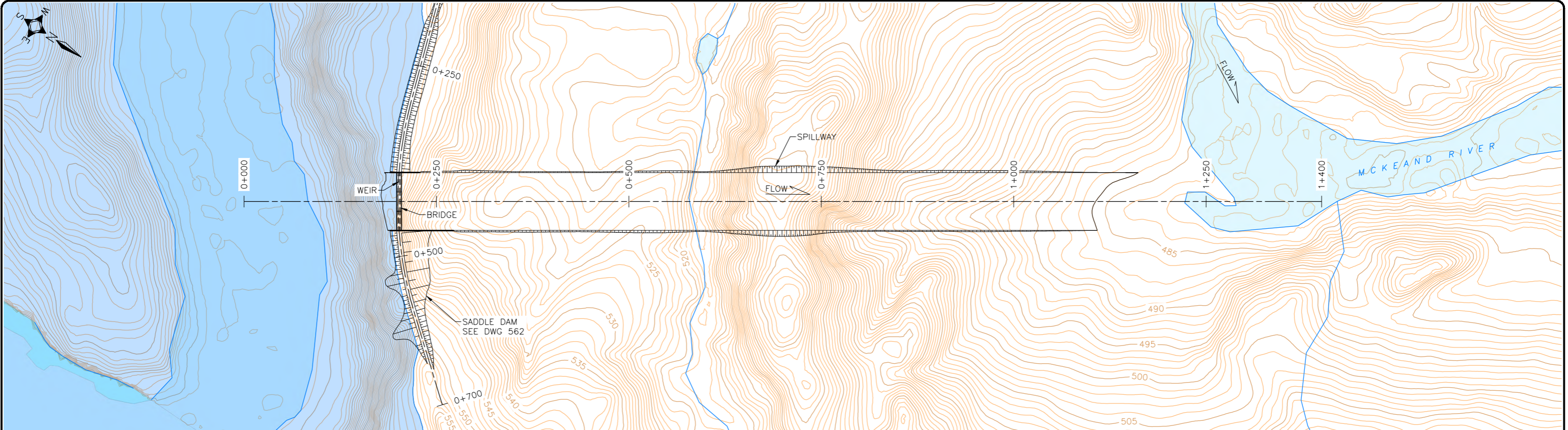
PROJECT NUMBER
1096-006
CADD NUMBER
4.3.036
DRAWING NUMBER
564

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METRES								
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REV	Y	M	D	REVISION DESCRIPTION	DRN	CHK	ENG	APP

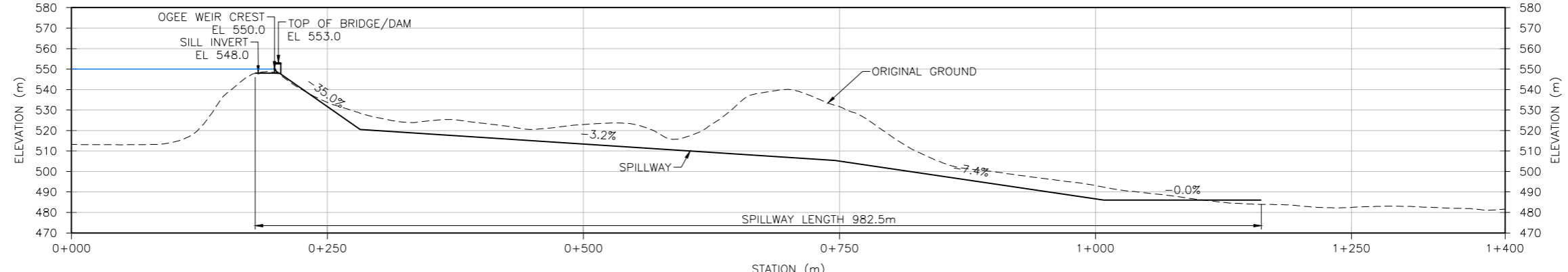


A TETRA TECH COMPANY

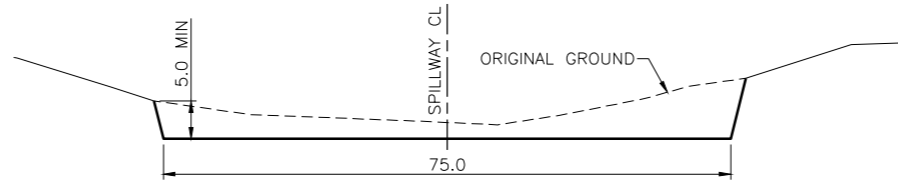
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PLAN
1:5000



PROFILE
H 1:5000
V 1:2500



TYPICAL SECTION
1:1000

- NOTES**
1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
 2. 1m INTERVAL CONTOURS GENERATED BY CPL FROM DEM DATA FROM THE ARCTICDEM POLAR GEOSPATIAL CENTER DATED APRIL 15 TO JUNE 17, 2017
 3. BASE MAPPING IS CANVEC VECTOR MAPPING OBTAINED FROM THE GOVERNMENT OF CANADA IN FEBRUARY, 2023.
 4. HORIZONTAL DATUM: NAD83 (CSRS) UTM ZONE 19.
 5. VERTICAL DATUM: WGS84 ELLIPSOID.

- LEGEND**
- TUNNEL/PENSTOCK
 - - - NEW ROAD
 - FSL
 - LSL
 - INUIT OWNED LANDS
 - WOODED AREA
 - NORMAL WATER
 - PROPOSED RESERVOIR
 - INTERMITTENT WATER
 - TRANSMISSION LINE



PERMIT TO PRACTICE		ENG STAMP	

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0	10	20	30	40	1:1000			
METRES								
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REV	Y	M	D	REVISION DESCRIPTION	DRN	CHK	ENG	APP



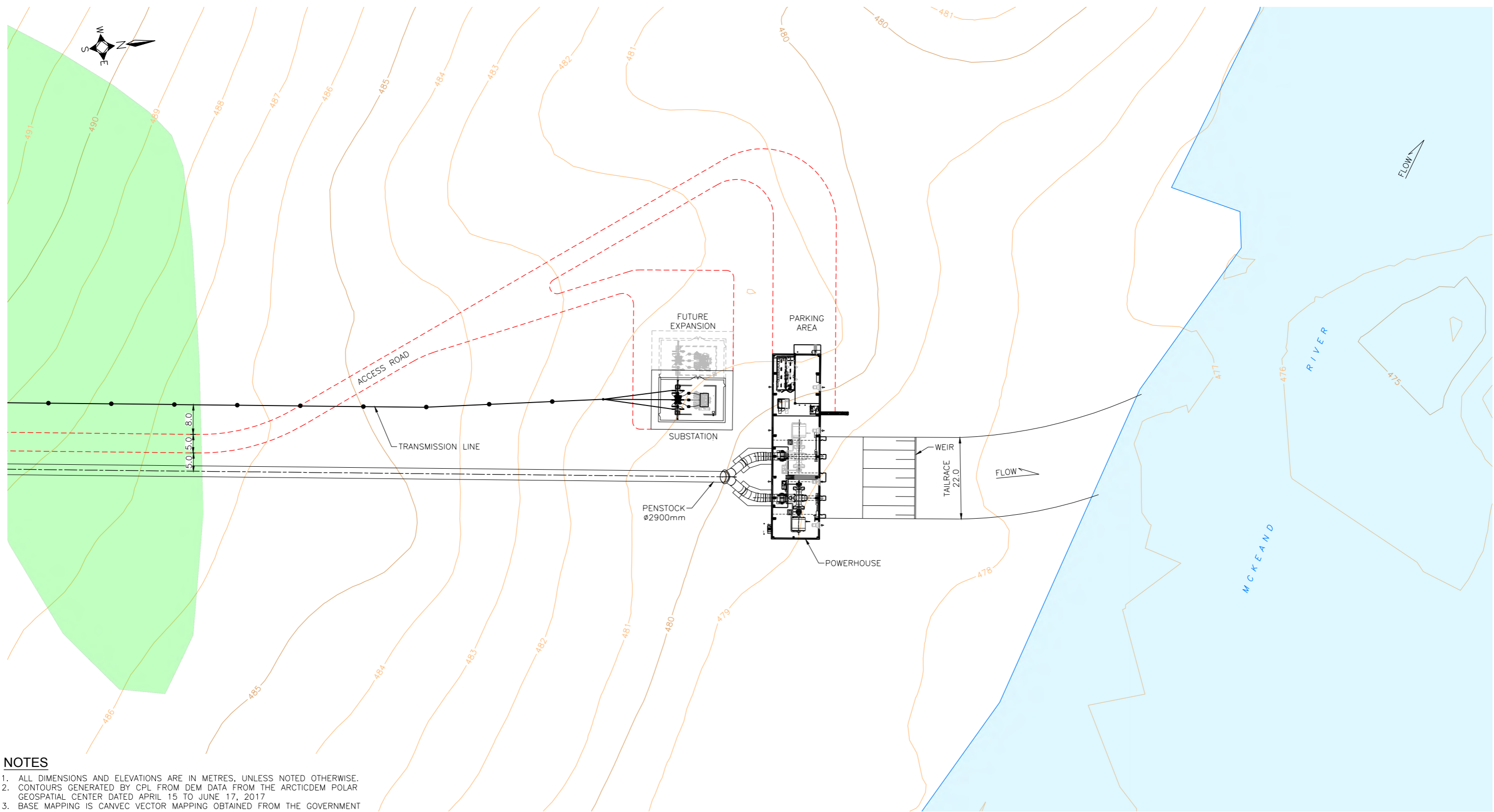
PRELIMINARY - NOT FOR CONSTRUCTION

GROWLER ENERGY

MCKEAND RIVER SOUTH HYDRO
GENERAL - PROJECT
SPILLWAY
PLAN & PROFILE

PROJECT NUMBER	1096-006
CADD NUMBER	4.3.036
DRAWING NUMBER	565

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PLAN - POWERHOUSE
1:1000

NOTES

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
2. CONTOURS GENERATED BY CPL FROM DEM DATA FROM THE ARCTICDEM POLAR GEOSPATIAL CENTER DATED APRIL 15 TO JUNE 17, 2017
3. BASE MAPPING IS CANVEC VECTOR MAPPING OBTAINED FROM THE GOVERNMENT OF CANADA IN FEBRUARY, 2023.
4. HORIZONTAL DATUM: NAD83 (CSRS) UTM ZONE 19.
5. VERTICAL DATUM: WGS84 ELLIPSOID.

LEGEND

- PENSTOCK
- NEW ROAD
- TUNNEL
- FSL
- LSL
- INUIT OWNED LANDS
- WOODED AREA
- NORMAL WATER
- PROPOSED RESERVOIR
- INTERMITTENT WATER
- TRANSMISSION LINE



PERMIT TO PRACTICE

ENG STAMP

SCALE 1:1 000

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REV	Y	M	D	REVISION DESCRIPTION	DRN	CHK	ENG	APP	



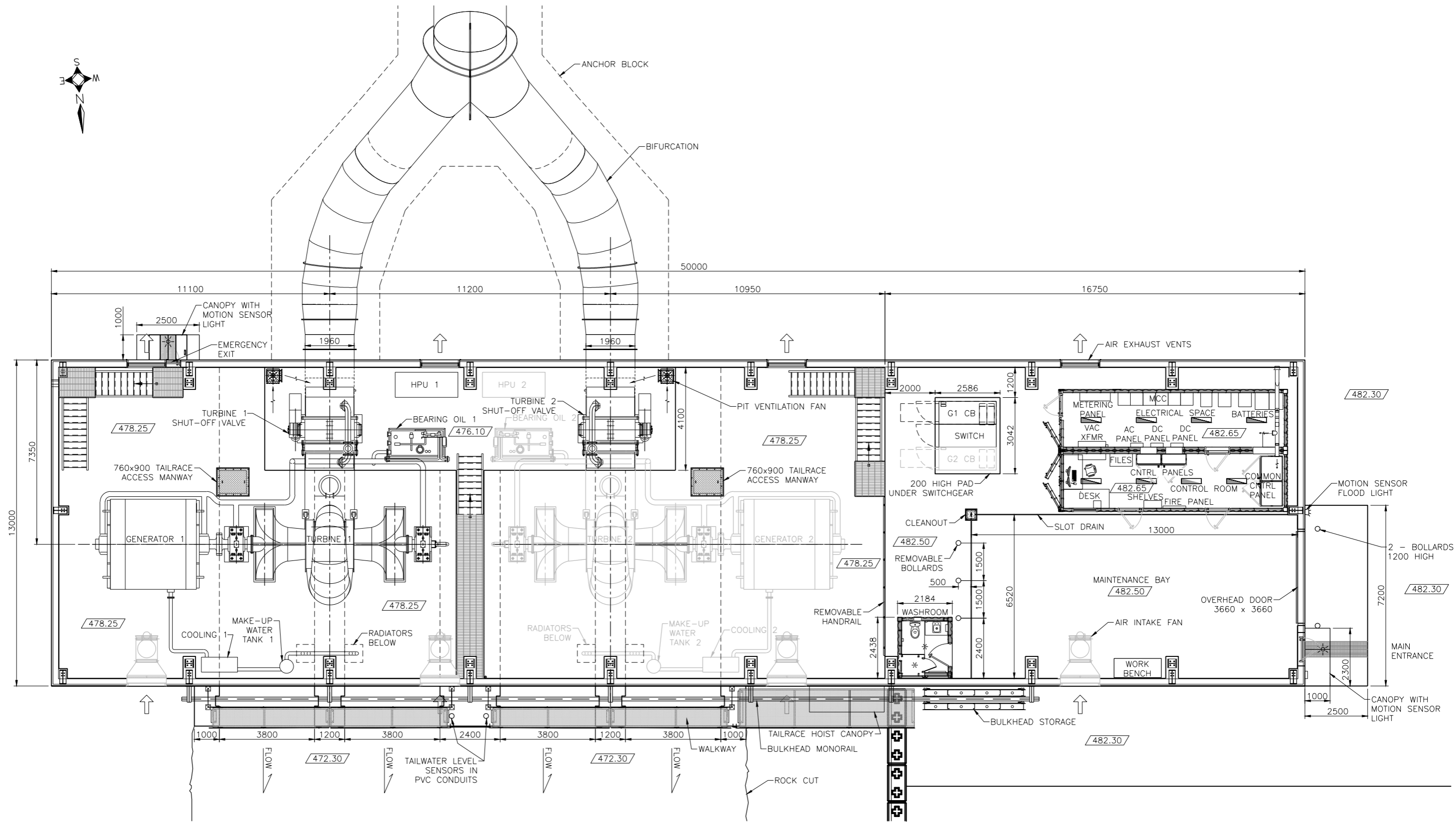
PRELIMINARY - NOT FOR CONSTRUCTION

GROWLER ENERGY

MCKEAND RIVER SOUTH PROJECT
GENERAL - PROJECT
POWERHOUSE
SITE PLAN

PROJECT NUMBER	1096-006
CADD NUMBER	4.3.040
DRAWING NUMBER	581

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NOTES

- ALL DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.



PERMIT TO PRACTICE

ENG STAMP

SCALE 1:10 000

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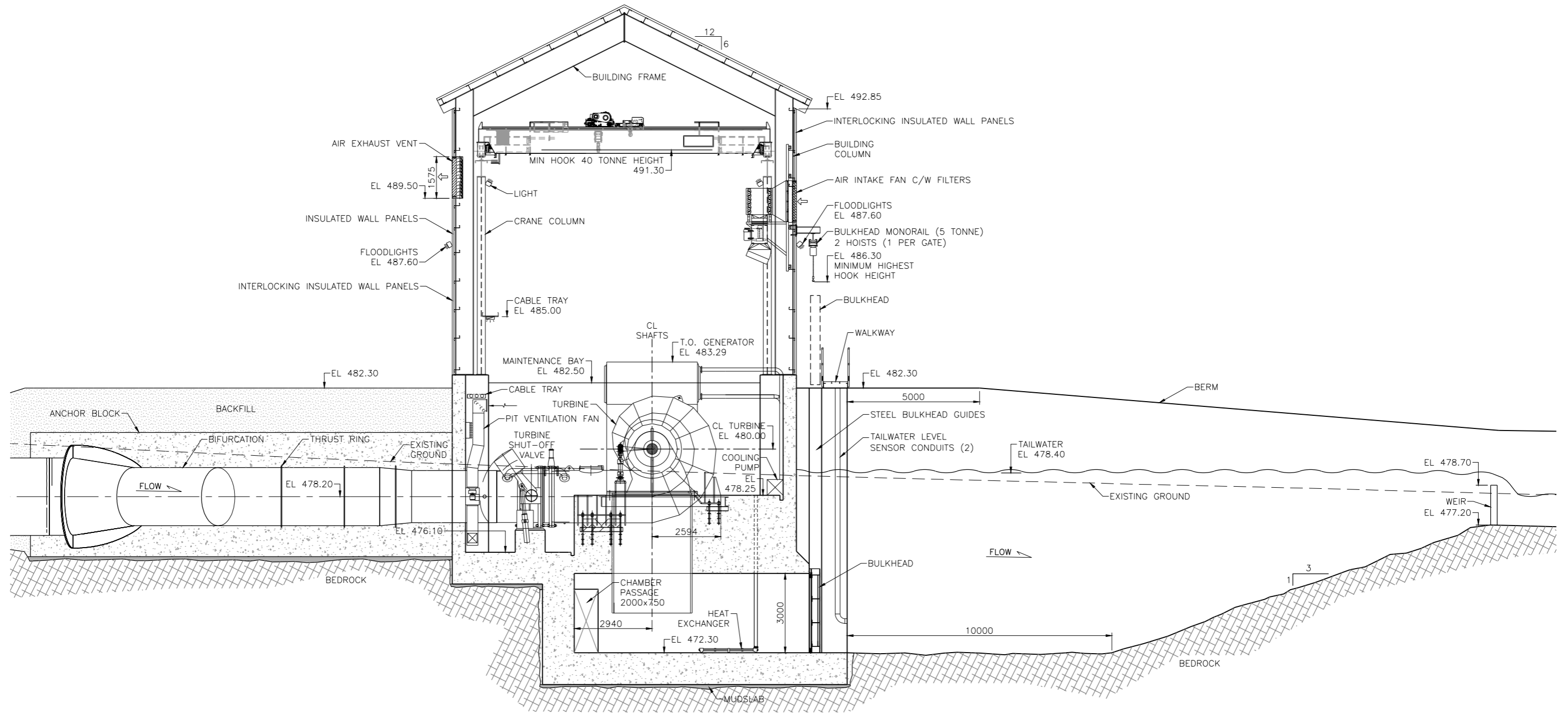
PRELIMINARY - NOT FOR CONSTRUCTION

GROWLER ENERGY

MCKEAND RIVER SOUTH PROJECT
GENERAL - PROJECT
POWERHOUSE
PLAN

PROJECT NUMBER	1096-006
CADD NUMBER	4.3.041
DRAWING NUMBER	582

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NOTES
 1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.



PERMIT TO PRACTICE	ENG STAMP	SCALE 1:10 000 0 100 200 300 400 500 METRES	 A TETRA TECH COMPANY		PRELIMINARY - NOT FOR CONSTRUCTION GROWLER ENERGY MCKEAND RIVER SOUTH PROJECT GENERAL - PROJECT POWERHOUSE SECTION	PROJECT NUMBER 1096-006 CADD NUMBER 4.3.041 DRAWING NUMBER 583																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>Y</th> <th>M</th> <th>D</th> <th>REVISION DESCRIPTION</th> <th>DRN</th> <th>CHK</th> <th>ENG</th> <th>APP</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>23</td> <td>12</td> <td>06</td> <td>NEW DRAWING</td> <td>ADF</td> <td>CPB</td> <td>PKK</td> <td>GS</td> </tr> </tbody> </table>		REV	Y	M	D	REVISION DESCRIPTION	DRN	CHK	ENG	APP	A	23	12	06	NEW DRAWING	ADF	CPB	PKK	GS					
REV	Y	M	D	REVISION DESCRIPTION	DRN	CHK	ENG	APP																
A	23	12	06	NEW DRAWING	ADF	CPB	PKK	GS																

APPENDIX 'B'

Project Road

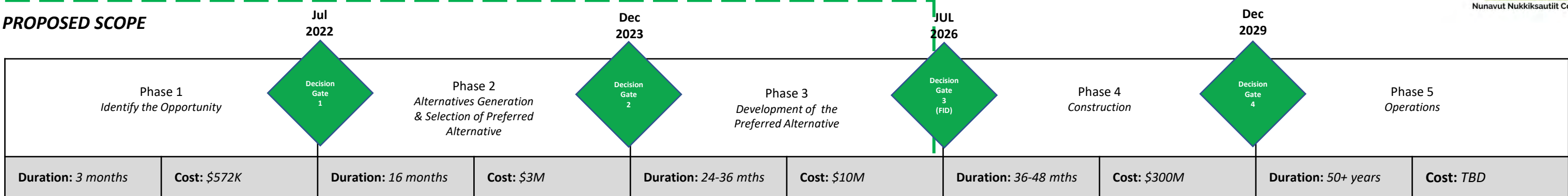
Mapping

PROJECT ROADMAP

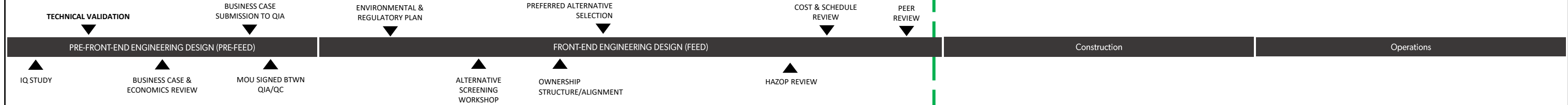
Iqaluit Nukkiksautiit Project



PROPOSED SCOPE



KEY MILESTONES



<p>ACTIONS:</p> <p>NNC to complete Project Validation using existing data and analysis. A business case and economics model will be created for the Iqaluit site. QIA to begin Inuit Qaujimagajuqangit study.</p> <p>KEY INTERIM DECISIONS:</p> <ul style="list-style-type: none"> Regional power outlook (inc. forecast) Commercial & Ownership Strategy Strategic Fit with Organizational Mandate Funding availability and Strategy <p>KEY DELIVERABLES:</p> <ul style="list-style-type: none"> Project Framing Document Technical Validation Report 'Book-end' Economics Model Phase 1 Decision Support Package Phase 2 Execution Plan Phase 2 Funding Plan Stakeholder Engagement Strategy 	<p>ACTIONS:</p> <p>NNC to look at viable alternative development schemes for Iqaluit; Alternatives will be evaluated and the Preferred Alternative/scheme will be proposed. Regulatory and Stakeholder Engagement Plan to be developed and implemented in this phase.</p> <p>KEY INTERIM DECISIONS:</p> <ul style="list-style-type: none"> Ownership structure Appropriate Project Boundaries & Frame Alternative Evaluation Criteria Preferred Alternative Selection <p>KEY DELIVERABLES:</p> <ul style="list-style-type: none"> Tusaqtavut Study Alternatives Generation & Selection Report Environmental & Regulatory Review Report Updated Project Framing Document Level 5 Cost Estimate Level 2 Schedule Economics Model (for Preferred Alternative) Phase 2 Decision Support Package Phase 3 Funding & Financing Plan Plan for Phase 3 	<p>ACTIONS:</p> <p>Several key activities to be completed in this phase, highlighted by detailed design of the Preferred Alternative for Iqaluit (Kuugaluk). Contracting Strategy will also be developed and implemented in this phase. Any early data collection and critical long lead item procurement (i.e. turbines) will occur in phase 3.</p> <p>KEY INTERIM DECISIONS:</p> <ul style="list-style-type: none"> Commercial Agreements (Land, water use, PPA etc) Environmental & Regulatory Strategy Contracting Strategy for Construction Phase Procurement of Critical Long Lead Items <p>KEY DELIVERABLES:</p> <ul style="list-style-type: none"> Technical Basis of Design Technical Drawings & Documents Work Breakdown Structure/Commercial Plan Power Purchase Agreement EA Project Registration Document Level 3 Schedule/Level 2 Cost Estimate Project Risk Assessment (Cold Eyes Review) Probabilistic/Risk Loaded Economics Model Phase 3 Decision Support Package (FID) Phase 4 Funding & Financing Plan Phase 4 Execution Plan 	<p>ACTIONS:</p> <p>Construction Phase will focus on the construction of the preferred alternative, with a high focus on safety, environmental stewardship, quality and engineering surveillance. Operations readiness will become a greater focus area in this phase. Project will be handed over to the operating entity at the end of the phase.</p> <p>KEY INTERIM DECISIONS:</p> <ul style="list-style-type: none"> Operating Philosophy Handover and Turnover Strategy Site Surveillance and Management Financial closeout strategy <p>KEY DELIVERABLES:</p> <ul style="list-style-type: none"> Phase 4 Construction Plan Site Safety Plan Project Controls Plan Risk Management Plan Quality Assurance & Surveillance Plan Environmental Monitoring Plan Lessons Learned - Construction Handover and Turnover Plan Ready For Operations Plan Commissioning & Start-up Plan 	<p><i>Operations Documents to be defined and implemented by the Operations Entity in Phase 2/3...</i></p>
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APPENDIX 'C'

CODAS Matrix

Alternatives Screening Matrix









Criterion	Description	Value	Goal Type	Weighting Scenario A	Weighting Scenario B	Weighting Scenario C	Weighting Scenario D	Weighting Scenario E	Weighting Scenario F	Armshow River	Armshow South	Jaynes Inlet	Cantley Bay	McKeand North	McKeand South	Sylvia Grinnell Bend	Sylvia Grinnell Jag	Niaqunguk Wind	Qasitujuak Wind	Kynerstey Wind	Armshow Wind	Jaynes Inlet Wind	Jaynes + Wind	Jaynes PSH + Wind	KI PSH + Wind
Capacity (Electric Load)	Total installed capacity.	MW	Min	0%	0%	0%	0%	0%	0%	10	5	10	10	10	10	10	10	10	10	10	10	10	15	15	30
Average Energy (Electric Load)	Average annual energy from the project which is consumed by load, excludes surplus energy.	MWh	Max	0%	0%	0%	0%	0%	0%	65,100	35,600	56,100	62,000	47,500	65,400	65,400	65,400	34,700	36,700	35,300	38,100	36,700	65,400	65,400	65,400
Renewable Supply (Electric Load)	Percentage of total energy demand met by renewables.	%	Max	0%	0%	0%	0%	0%	0%	99%	54%	86%	100%	73%	100%	100%	100%	53%	56%	54%	58%	56%	100%	100%	100%
Capital Cost (Electric Load)	Capital cost as a separate criterion from LCOE is intended to capture ability to finance / cost of capital. Projects may be too large to secure financing	\$ millions	Min	0%	0%	0%	0%	0%	0%	\$310	\$127	\$182	\$245	\$597	\$200	\$405	\$906	\$49	\$60	\$42	\$43	\$49	\$210	\$225	\$176
LCOE Aggregate (Electric Load)	Levelized cost of energy in 2023 dollars, 50 year economic life, 8% discount rate, no residual value, 2% inflation on operating and sustaining capex (hydro generator replacement, turbine overhauls, wind project repowering) and project energy pricing, effective 5% inflation on total cost of fossil fuel energy inclusive of fuel price projections and future carbon taxation, net of subsidies and capital cost offsets. Evaluated on total scenario load with no value for surplus renewable generation.	\$/MWh	Min	15%	0%	100%	0%	0%	0%	\$579	\$647	\$504	\$532	\$1,234	\$343	\$691	\$1,472	\$556	\$556	\$537	\$506	\$533	\$464	\$491	\$352
LCOE Renewable (Electric Load)	Same as above excluding diesel generation costs.	\$/MWh	Min	0%	100%	0%	0%	0%	0%	\$520	\$403	\$364	\$435	\$1,345	\$340	\$677	\$1,468	\$222	\$249	\$194	\$184	\$209	\$391	\$419	\$352
Emissions (Electric Load)	Carbon emission in tons of CO2 per year assuming heating fuel conversion to electric. Intended to capture significance beyond real cost accounted for in LCOE, which includes an estimate of escalation for carbon tax and fuel base pricing. Canada's target of net-zero emissions by 2050 or public / stakeholder perception of the same.	tons CO2 / year	Min	1%	0%	0%	0%	0%	1%	300	21,300	6,700	2,500	12,800	100	100	100	22,000	20,600	21,600	19,500	20,500	100	100	100
Capacity (Electric, Thermal, Industrial Loads)	Per above	MW	Min	0%	0%	0%	0%	0%	0%	15	5	10	20	50	30	30	40	30	30	30	30	30	45	45	120
Average Energy (Electric, Thermal, Industrial Loads)	Per above	MWh	Max	0%	0%	0%	0%	0%	0%	109	35,600	56,100	146,000	210,000	184,000	143,200	223,400	106,600	112,000	108,000	116,400	111,000	173,000	174,400	236,000
Renewable Supply (Electric, Thermal, Industrial Loads)	Per above	%	Max	0%	0%	0%	0%	0%	0%	46%	15%	24%	62%	89%	78%	61%	94%	45%	47%	46%	49%	47%	73%	74%	100%
Capital Cost (Electric, Thermal, Industrial Loads)	Per above	\$ millions	Min	0%	0%	0%	0%	0%	0%	\$333	\$127	\$182	\$463	\$1,759	\$262	\$457	\$953	\$113	\$124	\$105	\$107	\$112	\$306	\$321	\$438
LCOE Aggregate (Electric, Thermal, Industrial Loads)	Per above	\$/MWh	Min	15%	0%	0%	0%	100%	0%	\$649	\$813	\$775	\$581	\$974	\$387	\$626	\$503	\$601	\$590	\$592	\$567	\$586	\$460	\$463	\$273
LCOE Renewable (Electric, Thermal, Industrial Loads)	Per above	\$/MWh	Min	0%	0%	0%	100%	0%	0%	\$336	\$403	\$358	\$344	\$893	\$163	\$350	\$459	\$154	\$160	\$144	\$136	\$148	\$223	\$232	\$246
Emissions (Electric, Thermal, Industrial Loads)	Per above	tons CO2 / year	Min	0%	0%	0%	0%	0%	0%	91,000	144,000	128,000	64,000	19,300	38,000	67,000	9,400	93,000	89,000	91,800	85,800	89,700	45,400	44,400	100
Cold Climate Risks	Technical risks focusing on cold weather nature of projects. Ice management, cold weather adaptations.	Rating 1 = Low 5 = High	Min	3%	0%	0%	0%	0%	4%	2	2	2	2	2	4	3	3	1	1	1	1	1	2	4	4
Geotechnical	Technical risks related to geotechnical conditions. Rock quality for tunnelling, availability of material for dam construction.	Rating 1 = Low 5 = High	Min	1%	0%	0%	0%	0%	1%	2	1	1	4	4	2	2	2	1	1	1	1	1	1	1	1
Resource Availability	Technical risks associated with wind and water with respect to uncertainty and climate change).	Rating 1 = Low 5 = High	Min	1%	0%	0%	0%	0%	1%	1	3	1	1	3	1	3	3	3	3	3	3	3	3	3	3
Reliability	Technology associated risks with respect to outages, spare parts, maintenance, MTBF, repair time.	Rating 1 = Low 5 = High	Min	1%	0%	0%	0%	0%	1%	1	1	1	1	1	1	1	1	3	3	3	3	3	3	5	5
System Integration	Difficulty of system integration and control issues.	Rating 1 = Low 5 = High	Min	1%	0%	0%	0%	0%	1%	1	1	1	1	1	1	1	1	2	2	2	2	2	3	4	5
Access	Potential access issues risk.	Rating 1 = Low 5 = High	Min	1%	0%	0%	0%	0%	1%	2	2	3	1	5	3	2	2	1	2	2	2	2	4	4	2
Transmission Length	Longer transmission line increases risk of outages.	km	Min	1%	0%	0%	0%	0%	1%	45	45	96	52	140	60	29	14	7	30	1	1	5	96	96	30
Schedule	Approximate development years to operation considering scope of the project, equipment supply, regulatory approvals, contractor availability.	years	Min	2%	0%	0%	0%	0%	3%	5	5	5	6	7	6	6	6	4	4	4	4	4	5	5	5
Constructability	Complexity, availability of specialized equipment, reliance on weather windows, level of interfacing required, experience.	Rating 1 = normal challenges 5 = major challenges	Min	1%	0%	0%	0%	0%	1%	2	4	4	2	3	3	2	4	1	2	2	2	2	3	4	3
Scalability	Ability to accommodate scaled deployment.	Degree in Percent	Max	10%	0%	0%	0%	0%	14%	1	1	1	3	1	3	1	1	5	5	5	5	5	2	2	2
Health and Safety	Perceived or actual risk to project personnel and the public during construction and operations. Electrical safety, reservoir fluctuations during ice covered period, wind turbine noise, visual health impacts	Rating 1 = limited issues 5 = major issues	Min	5%	0%	0%	0%	0%	7%	3	1	1	3	2	1	5	5	3	2	2	1	1	1	1	2
Biophysical Environment	Interactions including vegetation/habitat as well as aquatic, terrestrial, and avian species. Include potential adverse effects on Species at Risk, contaminant uptake (ecological risk), population dynamics and habitat disturbance / disruption / destruction. Consider the potential for residual adverse effects to be Significant. Exclude consideration of induced effects (harvesting / resource use, economy, tourism).	Rating 1 = no negative residual effects, no mitigation measures required. 5 = Several predicted negative residual effects, some requiring custom-designed (unproven) mitigation and monitoring measures and/or compensation requirements.	Min	10%	0%	0%	0%	0%	14%	5	5	4	5	5	5	5	5	2	4	4	4	4	4	4	4
Local Infrastructure	Degree to which new local infrastructure is required to support the development including electrical system upgrades, substations, roads, fabrication facilities.	Rating 1 = limited 5 = significant	Min	0%	0%	0%	0%	0%	0%	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Economic Benefits	Direct and indirect contributions to the local economy during construction and throughout the project lifecycle including employment, service industry benefits, growth potential associated with any inherent surplus sustainable energy supply.	Rating 1 = limited 5 = significant	Max	5%	0%	0%	0%	0%	7%	2	2	2	2	2	2	2	2	3	3	3	3	3	4	4	4
Stakeholder Support	Perceived or actual support (or opposition) from the public, utility, government and regulators. Consider "social license" and how many intervenors are likely.	Rating 1 = opposition 5 = support	Max	2%	0%	0%	0%	0%	3%	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Rightsholder Support	Perceived or actual support (or opposition) from the land rights holders.	Rating 1 = opposition 5 = support	Max	2%	0%	0%	0%	0%	3%	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Size Perception	Perceived negative view associated with a large footprint / large appearance viewed from Iqaluit and commonly travelled routes.	Rating 1 = limited visual 5 = significant visual	Min	3%	0%	0%	0%	0%	4%	3	1	1	3	3	2	5	5	3	2	2	2	1	1	1	2
Resource Use	Impacts to terrestrial, aquatic, or marine resource use. Impacts to fishing and harvesting patterns, hunting, foraging, use for recreation and tourism.	Rating 1 = limited 5 = significant	Min	15%	0%	0%	0%	0%	21%	5	2	2	2	2	2	5	5	2	3	3	3	3	2	2	2
Protected Areas	Parks or wildlife, ecological, conservation reserves potentially affected by the project	Number of different areas affected	Min	2%	0%	0%	0%	0%	3%	3	3	2	1	1	1	4	4	1	1	1	5	2	2	2	1
Permits and Approvals General	Perceived or actual level of effort, risks, issues with lack of framework or possible changes, number of required permits and approvals. Impact to land use planning process.	Rating 1 = normal effort, no new processes 5 = significant effort, new processes required	Min	3%	0%	0%	0%	0%	4%	5	5	5	5	5	5	5	5	3	3	3	4	4	5	5	5
NIRB	Project is the same scope as current NIRB file 13UN006 either in part or completely.	Percentage of similarity, e.g. same site, but different conveyance = 70%	Max	0%	0%	0%	0%	0%	0%	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Inuit Owned Lands	Percentage of the project footprint on Inuit Owned Lands, including transmission line.	Percentage	Max	0%	0%	0%	0%	0%	0%	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99

Notes
 1. Projects including related transmission lines to Iqaluit.
 2. Total weighting is 100%. Weighting provided by Growler Energy / NNC January 25, 2023.
 3. Scores displayed as "99" have yet to be determined/provided.

APPENDIX 'D'

Alternatives Posters



-  ልኬዳዎ
Direction to Iqaluit
-  ልዎስ
Wind
-  ልፊሊስ
Hydro
-  ልዎስ + ልፊሊስ
Wind + Hydro
-  ፕሮፖላንድ ልዎስ
Diesel
-  ጎረቤት ግልጽ
Green Light
-  ግልጽ ግልጽ ግልጽ
Yellow Light
-  ልዎስ ግልጽ
Red Light

01 ልዎስ ልኬዳዎ ልፊሊስ ልዎስ
McKeand River South Hydro

13 ልዎስ ልኬዳዎ ልፊሊስ ልዎስ
McKeand River North Hydro

15 ልኬዳዎ ልኬዳዎ ልዎስ ልዎስ
Slyvia Grinnell Bend Hydro

16 ልኬዳዎ ልኬዳዎ ልዎስ ልዎስ
Slyvia Grinnell Jag Hydro

03 ልዎስ ልዎስ
Niaqunguk Wind

10 ልዎስ ልዎስ ልዎስ
Kynersley Lake Wind

08 ልዎስ ልዎስ ልዎስ ልዎስ
Kynersley Iqalliarvik Hydro Pumped Storage

09 ልዎስ ልዎስ ልዎስ ልዎስ
Qasitujuak Lake Wind

04 ልዎስ ልዎስ
Jaynes Inlet Wind

ልኬዳዎ
Iqaluit
ርገዎስ
You are here

06 ልዎስ ልዎስ
Armshow Lake Wind

14 ልዎስ ልዎስ ልፊሊስ ልዎስ
Armshow River Hydro

11 ልዎስ ልዎስ ልፊሊስ ልዎስ
Armshow South Hydro

02 ልዎስ ልዎስ ልፊሊስ ልዎስ
Jaynes Inlet Hydro + Wind









04 ልዎስ ልዎስ
Jaynes Inlet Wind

07 ልዎስ ልዎስ ልፊሊስ
Jaynes Inlet Hydro

05 ልዎስ ልዎስ ልፊሊስ ልዎስ ልዎስ
Jaynes Inlet Pumped Storage + Wind

12 ልዎስ ልፊሊስ ልዎስ
Cantley Bay Hydro



-  ልኬዳዎ
Direction to Iqaluit
-  ልዎስ
Wind
-  ልፊሊ
Hydro
-  ልዎስ + ልፊሊ
Wind + Hydro
-  ፕሮፖላንድ ልዎስ
Diesel
-  ጎረቤት ግልጽ
Green Light
-  ግልጽ ግልጽ ግልጽ
Yellow Light
-  ልዎስ ግልጽ
Red Light

01 ልዎስ ልኬዳዎ ልፊሊ ልፊሊ
McKeand River South Hydro

13 ልዎስ ልኬዳዎ ልፊሊ ልፊሊ
McKeand River North Hydro

15 ልኬዳዎ ልፊሊ ልፊሊ ልፊሊ
Slyvia Grinnell Bend Hydro

16 ልኬዳዎ ልፊሊ ልፊሊ ልፊሊ
Slyvia Grinnell Jag Hydro

03 ልፊሊ ልፊሊ
Niaqunguk Wind

10 ልፊሊ ልፊሊ ልፊሊ
Kynersley Lake Wind

08 ልፊሊ ልፊሊ ልፊሊ ልፊሊ
Kynersley Iqalliarvik Hydro Pumped Storage

09 ልፊሊ ልፊሊ ልፊሊ
Qasitujuak Lake Wind

04 ልፊሊ ልፊሊ
Jaynes Inlet Wind

ልኬዳዎ
Iqaluit
ርገዎ ልፊሊ
You are here

06 ልፊሊ ልፊሊ
Armshow Lake Wind

14 ልፊሊ ልፊሊ ልፊሊ ልፊሊ
Armshow River Hydro

11 ልፊሊ ልፊሊ ልፊሊ ልፊሊ
Armshow South Hydro

02 ልፊሊ ልፊሊ ልፊሊ ልፊሊ
Jaynes Inlet Hydro + Wind

04 ልፊሊ ልፊሊ
Jaynes Inlet Wind

07 ልፊሊ ልፊሊ ልፊሊ
Jaynes Inlet Hydro

05 ልፊሊ ልፊሊ ልፊሊ ልፊሊ ልፊሊ
Jaynes Inlet Pumped Storage + Wind

12 ልፊሊ ልፊሊ ልፊሊ
Cantley Bay Hydro



24km
ᐃᖃᓗᓐᓂᓐ · To Iqaluit



ᐱᐅᐸᓐᓂᖅ ᖃᐅᓚᓐᓂᖅ
Red Light



14



ᐱᐅᐸᓐᓂᖅ ᐃᖃᓗᓐ ᐃᓚᐸᓐᓂᖅ
Armshow River Hydro

11



ᐱᐅᐸᓐᓂᖅ ᐸᓚᐸᓐᓂᖅ ᐃᓚᖅ ᓂᖅᓂᖅ
Armshow South Hydro

06



ᐱᐅᐸᓐᓂᖅ ᐃᓚᓚᓐ
Armshow Lake Wind



99.3%

ᐱᐅᓗᐱᓐᓂᖅ ᐸᖅᓂᖅ
ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ
ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
Reduction in Diesel
Consumption
for Electricity Generation



56%

ᐱᐅᓗᐱᓐᓂᖅ ᐸᖅᓂᖅ
ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ
ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
Reduction in Diesel
Consumption
for Electricity Generation



51.5%

ᐱᐅᓗᐱᓐᓂᖅ ᐸᖅᓂᖅ
ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ
ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
Reduction in Diesel
Consumption
for Electricity Generation

0.9/10

ᐸᖅᓂᖅ ᐸᖅᓂᖅ
Overall Rating

4.5/10

ᐸᖅᓂᖅ ᐸᖅᓂᖅ
Overall Rating

5.1/10

ᐸᖅᓂᖅ ᐸᖅᓂᖅ
Overall Rating

ᐃᓚᐸᓐᓂᖅ

- 99% ᐃᓚᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
- ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ (ᐸᓚᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ)
- ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐸᖅᓂᖅ
- ᐱᐅᐸᓐᓂᖅ MW ᐃᓚᐸᓐᓂᖅ ᐸᖅᓂᖅ
- ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
- ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
- ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
- ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ
- ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ

Summary

- 99% of energy demand met by renewables
- Low to Medium technical risks (cold climate + Geotech)
- Low constructability risk
- Large MW capacity
- Heavy land and resource use year-round by Iqalungmiut
- Will affect the migration of arctic char. This is an important char habitat and fishing area
- Will break up a large amount of land used for animal habitats. This is an important migratory corridor for many animals
- Site used for harvesting various species (beluga, bowhead, clam seaweed, ptarmigan, caribou and berry harvesting).
- Will affect waterways leading to Iqaluit, including areas used to teach fishing to younger generations
- Health and Safety risk rated "medium"

ᐸᖅᓂᖅ ᐸᖅᓂᖅ · The Bottom Line

ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ

The last time renewable energy was explored for Iqaluit, this site was rejected due to its importance for hunting, fishing, recreation and animal habitat. We hear you. All options in this area are not recommended.



ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ ᐃᖃᓗᓐᓂᖅ ᐱᐅᐸᓐᓂᖅ ᐸᖅᓂᖅ

For more information, read about this option in your handout or online.



52km
ᐃᖃᓂᓐᓂᓐ To Iqaluit

Red Light



12

ᐆᓐᓕ ᐸᐃ ᐃᐸᓕᓂᓂᓐᓂᓐ Cantley Bay Hydro

ᓇᐃᓐᓂᓐ

- 100% ᐆᐸᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᓇᐸᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
- ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ

Summary

- 100% of energy demand met by renewables
- Lowest site access issues
- Minimal intrusions on protected areas
- Very low CO2 emissions
- Median cold climate risk
- Low risk associated with reliability
- Longer development time (6 years)
- This area is used for harvesting seal and caribou. Lots of harvesting activities near mouth of river
- Cabins in the area and used a hub for a range of Inuit land such as community gatherings and harvesting ceremonies including celebration of a youths' first hunt
- Cultural sites – including campsites used by Tuniit and row of inukshuk
- Highest geotechnical risk
- Will break up a large amount of land used for animal habitats. Caribou calving grounds and Seal den area



99.8%

ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
Reduction in Diesel Consumption for Electricity Generation

ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ - The Bottom Line

Cantley Bay Hydro would be a very large dam. We would not recommend this site because of the loss of animal habitat and the high geotechnical risk.

ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ



ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ

For more information, read about this option in your handout or online.

4/10

ᐸᓂᓐᓂᓐᓂᓐ ᐸᓂᓐᓂᓐᓂᓐ
Overall Rating



ᓄᓐᓴᓐ ᓄᓄᓄᓄᓄᓄᓄᓄ ᓄᓄᓄᓄᓄᓄᓄ

Nunavut Nukkiksautiit Corporation