ᓄᓇᕗᒻ ᐊᕐᓂᑎᓪᓗᒍᓄᑦ ᑲᑎᒪᔨᖏᑦᑎᒍᑦ ᑐᑭᓯᐊᓂᖅ ᖃᐅᔨᖅᑕᑦ ᖃᒥᖅᖃᐅᔾᔪᖅ #126444

Evaluation of the Deep Geothermal Potential of Iqaluit, Nunavut, Canada

ᑐᑭᓯᖅᑕᐅᔪᖅ ᖃᓄᐃᓕᓴᐃᓐᓇ:	New
ᐱᓕᕆᐊᒃᑲᐅᔪᒪᔨᑦ ᖃᓄᐃᓕᓴᐃᓐᓇ:	Scientific Research
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ᖃᓄᐃᑦᑑᑎᓂᒃ ᐱᓕᕆᐊᖃᕐᓂᐊᕆᐊᖕᒐᓐᓂᒃ

ᖃᓪᓗᓈᑎᑐᑦ: Evaluation of the Geothermal Potential of Iqaluit Ysaline Bacon1, Xavier Leveillee Dallaire1, and Pr. Jasmin Raymond11 Institut National de la Recherche Scientifique (INRS), Québec, Canada The project evaluates the geothermal potential of Iqaluit, Nunavut, to support decarbonization and energy autonomy for northern communities. Context and justification: northern settlements are heavily dependent on imported diesel for heat and power, resulting in high costs, logistical vulnerability and negative environmental impacts. Territorial knowledge gaps (particularly limited data on geothermal gradients, subsurface thermal properties and fracture-network characteristics) have hindered reliable design and risk assessment for both shallow ground-source heat pumps (GSHPs) and deeper enhanced geothermal systems (EGS). There is also strategic interest from the Department of National Defence in decarbonizing northern operations; consequently, site selection prioritizes locations that could serve both civilian energy needs (residential and commercial heating, potential electricity) and military resilience. Two technological pathways are targeted: GSHPs for space heating and EGS - using fractured deep reservoirs - aimed at heat extraction and electricity generation.Short-term objectives (2025–2026) concentrate on targeted field acquisition. This summer campaign within a 10-km radius of Iqaluit will collect 20–30 representative surface rock samples across crystalline basement, sedimentary sequences and surficial/fractured units to obtain thermal conductivity, volumetric heat capacity and density. Systematic scanline fracture surveys on outcrops will document fracture orientation, spacing, aperture and connectivity to parameterize permeability and potential fluid pathways relevant to EGS screening. Prior to and during fieldwork the team will engage local and Indigenous organizations to co-design culturally appropriate protocols, communicate objectives, and incorporate community priorities into site selection and dissemination plans. All field activities will be non-invasive (surface sampling and observational mapping) and avoid collection of sensitive Indigenous knowledge.Long-term objectives (2026–2030) aim to expand regional understanding and produce decision-ready analyses for potential pilot deployments. Laboratory measurements will feed into numerical models to estimate local geothermal gradients, predict thermal responses for GSHP systems accounting for permafrost and latent-heat effects, and simulate reservoir behaviour for candidate EGS targets including uncertainty quantification. Techno-economic assessments will determine levelized cost of heat and electricity, lifecycle performance, logistical constraints for Arctic deployment, risk allocation for exploratory drilling, and staged implementation scenarios (e.g., GSHP demonstrators preceding exploratory wells). Outputs will explicitly compare geothermal options with diesel baselines to inform community and defence stakeholders.Data management and dissemination emphasize transparency, accessibility and local relevance. Validated datasets (thermal property measurements, fracture characterizations, analytical calculations, modelling outputs and non-sensitive imagery) Chaire de recherche du Canada sur l'analyse des systèmes géoénergétiques durables will be archived at INRS and, following validation and peer review, deposited in Borealis and the Northern Geothermal Database to support reuse across northern Canada. Anticipated outputs include doctoral theses, peer-reviewed articles, conference presentations and plain-language materials for community briefings. Knowledge mobilization will prioritize iterative feedback sessions, visual materials and locally appropriate communication channels.The project commits to culturally respectful engagement, environmental safeguards for sampling and site visits, and long-term availability as a technical resource for communities and decision-makers. By closing critical data gaps and producing transparent, locally relevant assessments, the project aims to enable informed pathways for geothermal pilot projects that advance low-carbon, resilient energy systems for Iqaluit and other northern communities.

ᐅᐃᕖᑎᑐᑦ: Évaluation du potentiel géothermique d'IqaluitYsaline Bacon[1], Xavier Leveillee Dallaire[1] et Pr. Jasmin Raymond[1][1] Institut national de la recherche scientifique (INRS), Québec, CanadaLe projet évalue le potentiel géothermique d'Iqaluit, au Nunavut, afin de soutenir la décarbonation et l'autonomie énergétique des communautés nordiques.Contexte et justificationLes collectivités du Nord dépendent fortement du diesel importé pour le chauffage et la production d'électricité, ce qui entraîne des coûts élevés, une vulnérabilité logistique et des impacts environnementaux négatifs. Les lacunes dans les connaissances du territoire — notamment le manque de données sur les gradients géothermiques, les propriétés thermiques du sous-sol et les caractéristiques des réseaux de fractures — ont freiné la conception fiable et l'évaluation des risques, tant pour les systèmes géothermiques peu profonds à pompe à chaleur (GSHP) que pour les systèmes géothermiques stimulés en profondeur (EGS).Le

ministère de la Défense nationale manifeste également un intérêt stratégique pour la décarbonation des opérations nordiques. Ainsi, la sélection des sites vise des emplacements pouvant répondre à la fois aux besoins énergétiques civils (chauffage résidentiel et commercial, production potentielle d'électricité) et à la résilience militaire. Deux filières technologiques sont ciblées :GSHP : pompes à chaleur géothermiques pour le chauffage des bâtiments ;EGS : systèmes géothermiques stimulés exploitant des réservoirs fracturés profonds pour extraire de la chaleur et produire de l'électricité.Objectifs à court terme (2025–2026)Les objectifs immédiats portent sur une campagne de terrain ciblée. Cet été, dans un rayon de 10 km autour d'Iqaluit, 20 à 30 échantillons représentatifs de roches de surface seront prélevés dans le socle cristallin, les séquences sédimentaires et les unités superficielles ou fracturées. Ces échantillons serviront à mesurer :la conductivité thermique ;la capacité calorifique volumique ;la densité.Des relevés systématiques des fractures sur affleurements permettront aussi de documenter :l'orientation des fractures ;leur espacement ;leur ouverture ;leur connectivité.Ces données serviront à estimer la perméabilité et les voies potentielles de circulation des fluides, essentielles pour évaluer les possibilités EGS.Avant et pendant les travaux, l'équipe collaborera avec des organisations locales et autochtones afin de coélaborer des protocoles culturellement appropriés, expliquer les objectifs du projet et intégrer les priorités communautaires dans le choix des sites et la diffusion des résultats. Toutes les activités de terrain seront non invasives (échantillonnage de surface et cartographie d'observation) et excluront la collecte de savoirs autochtones sensibles.Objectifs à long terme (2026–2030)Les objectifs futurs visent à approfondir la compréhension régionale et à produire des analyses directement utiles à la prise de décision pour d'éventuels projets pilotes.Les mesures de laboratoire alimenteront des modèles numériques pour :estimer les gradients géothermiques locaux ;prédire la réponse thermique des systèmes GSHP en tenant compte du pergélisol et des effets de chaleur latente ;simuler le comportement de réservoirs candidats pour l'EGS, avec quantification des incertitudes.Des analyses technico-économiques permettront d'évaluer :le coût actualisé de la chaleur et de l'électricité ;la performance sur le cycle de vie ;les contraintes logistiques propres à l'Arctique ;les risques liés au forage exploratoire ;des scénarios de déploiement progressif (ex. démonstrateurs GSHP avant forage profond).Les options géothermiques seront comparées explicitement aux solutions actuelles au diesel afin d'éclairer les décideurs communautaires et militaires.Gestion des données et diffusionLe projet met l'accent sur la transparence, l'accessibilité et la pertinence locale. Les ensembles de données validés (propriétés thermiques, caractérisation des fractures, calculs analytiques, résultats de modélisation et imagerie non sensible) seront archivés à l'INRS puis, après validation et évaluation scientifique, déposés dans Borealis et dans la Northern Geothermal Database afin de favoriser leur réutilisation à l'échelle du Nord canadien.Les retombées prévues comprennent :des thèses doctorales ;des articles scientifiques évalués par les pairs ;des présentations en conférence ;du matériel vulgarisé pour les communautés locales.Le transfert des connaissances reposera sur des rencontres de rétroaction régulières, des supports visuels et des moyens de communication adaptés au contexte local.Engagement du projetLe projet s'engage à maintenir un dialogue respectueux sur le plan culturel, à appliquer des mesures de protection environnementale lors des visites et échantillonnages, et à demeurer une ressource technique durable pour les communautés et les décideurs.En comblant des lacunes critiques en données et en produisant des évaluations transparentes et ancrées localement, ce projet cherche à ouvrir des voies réalistes vers des projets pilotes géothermiques favorisant des systèmes énergétiques sobres en carbone et résilients à Iqaluit ainsi que dans d'autres communautés nordiques.

ᐃᓄᒃᑎᑐᑦ: ᖃᐅᔨᓴᕐᑕᐅᕗᖅ ᓄᓇᐅᑉ ᐆᓇᕐᓂᖓ ᐅᔭᖅᓂ ᐊᐅᓯᓐᓇᖅᑐᖓ ᐆᒻᒪᕐᑯᑎᓕᐊᖑᔪᓐᓇᕐᖣᑦ ᐃᖃᓗᓐᓂ ᓵᓖᓐ ᐸᐃᑲᓐ1, Hᐃᕆᐋ ᓕᕆᓪᓖ ᑕᓕᐃ1, ᐊᒻᒪᓗ ᐊᖓᔪᖅᑳᖓᑦ ᔭᔅᒥᓐ ᐅᓚᐃᒪᓐᑦ11 ᐃᓕᓐᓂᐊᕐᕕᒃ ᑲᓇᑕᒥ ᑮᓪᓕᓯᓐᓂᐊᕆᓂᖅ ᖃᐅᔨᓴᕐᑎᒻᒪᕆᑦ, ᑯᐸᒃ, ᑲᓇᑕ ᐅᓇ ᐱᓕᕆᐊᖑᔪᖅ ᖃᐅᔨᓴᕐᑐᖅ ᓄᓇᐅᑉ ᐆᓇᕐᓂᖓ ᐅᔭᖅᓂ ᐊᐅᓯᓐᓇᖅᑐᖓ ᐆᒻᒪᕐᑯᑎᖃᐅᑎᖃᕐᕕᐅᓯᓐᓇᕐᒪᖔᑦ ᐃᖃᓗᓐᓄᑦ, ᓄᓇᕗᑦ, ᐃᑲᔪᕐᓗᓂ ᐸᐅᕿᓐᖏᑦᑐᓂᒃ ᐊᒻᒪᓗ ᐆᒻᒪᕐᑯᑎᖃᐅᑎ ᐃᒻᒥᒎᖅᑐᖅ ᐅᑭᐅᖅᑕᖅᑐᖅ ᓄᓇᖏᓐᓂ. ᐃᓗᓕᖏᑦ ᐊᒻᒪᓗ ᐋᕿᑦᑎᐊᕆᐊᕈᑎᑦ: ᐅᑭᐅᖅᑕᖅᑐᖅ ᓄᓇᖏᓐᓄᑦ ᐊᖏᔪᒥᒃ ᐊᑐᕐᒪᑕ ᑭᓯᐊᓂᐅᓪᓗᑎᒃ ᑏᓯᕐᒥᒃ ᑭᐊᒃᓴᐅᑎᒥᖕᓄᑦ ᐊᒻᒪᓗ ᖃᐅᒻᒪᕐᑯᑎᒥᖕᓄᑦ, ᐊᑭᑐᔪᐊᓘᖃᑦᑕᖅᑐᖅ, ᐊᑦᑕᕐᓇᖅᑐᒦᑎᑦᑎᔪᓐᓇᖅᑐᑦ ᐊᒻᒪᓗ ᐱᐅᓐᖏᑦᑑᔪᑦ ᓯᓚᒧᑦ ᐊᕙᑎᑦᑎᓄᑦ ᐊᒃᑐᐃᔪᑦ. ᑎᐅᓕᑐᐊᓕᕐᑎᒍᑦ ᖃᐅᔨᒪᔭᕕᖃᓐᖏᑦᑐᑦ ᐃᖅᐸᖅᓯᒪᔪᖅ (ᐱᓗᐊᖅᑐᒥᒃ ᖃᐅᔨᒪᔾᔪᑎᒃᓴᑦ ᓄᓇᐅᑉ ᐆᓇᕐᓂᖓ ᐅᔭᖅᓂ ᐊᐅᓯᓐᓇᖅᑐᓚᓴᖏᑦ, ᓄᓇᐅᑉ ᐃᑭᐊᖓᓂ ᐆᓇᖅᑑᑕᐅᓂᖏᑦ ᐊᒻᒪᓗ ᖁᐱᐅᕋᖅᓯᒪᓂᖏᑦ - ᐃᒥᖕᓄᑦ ᐊᑕᔪᑦ ᑕᑯᓪᓗᒋᑦ) ᓄᖃᖓᑎᑦᑎᓯᒪᖓᒪᑕ ᐊᑑᑎᖃᖅᑐᓂᒃ ᓴᓇᓯᒪᓂᒃᓴᖓᓂᒃ ᐊᒻᒪᓗ ᐊᑦᑕᕐᓇᕐᒪᖔᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᓂ ᑕᒪᐃᓐᓂ ᓄᓇᒥ ᐆᓇᖅᑐᖃᐅᑎᖃᕐᕕᒃ ᒥᓪᓗᐊᕐᕕᖏᑦ ᐊᒻᒪᓗ ᐱᐅᓯᕚᓪᓕᑦᑎᐊᕐᓗᒋᑦ ᓄᓇᐅᑉ ᐆᓇᕐᓂᖓ ᐅᔭᖅᓂ ᐊᐅᓯᓐᓇᖅᑐᓕᐅᕐᕕᖏᑦ. ᐋᕿᒃᓯᒪᔾᔪᑎᒃᓴᖅᑐᖅᑕᐅᖅ ᐱᓕᕆᔪᒪᒍᑎᒃ ᐅᓇᑕᖅᑐᒃᓴᓕᕆᔨᒃᑯᑦ ᑲᓇᑕ ᐸᐅᖅ ᐱᑕᖃᕈᓐᓃᖅᑎᑕᐅᓗᓂ ᐅᑭᐅᖅᑕᖅᑐᒥ ᐊᐅᓚᑦᑎᕙᒋᔭᕐᒥᖕᓂᒃ; ᑎᑭᐅᑎᓂᐊᖅᑐᑦ, ᐃᓂᒃᓴᒥᖕᓂᒃ ᓂᕈᐊᖅᓯᓂᖏᑦ ᓯᕗᓪᓕᐅᑎᔭᕆᐊᖃᕐᑕᒥᖕᓂᒃ ᐃᓂᒃᓴᒥᖕᓂ ᐅᑯᐊᓗ ᐱᔨᑦᑎᕋᖅᑐᑦ ᑕᒪᐃᓐᓄ ᓄᓇᓕᖕᓂ ᐆᒻᒪᕐᑯᑎᖃᐅᑎᖃᕐᑎᑦᑎᓗᑎᒃ (ᐃᓪᓗᓂᒃ ᐊᒻᒪᓗ ᑮᓇᐅᔭᓕᐅᕐᕕᐅᔪᓂᒃ ᐃᓪᓗᓂᒃ ᐅᖅᑰᓴᐅᑎᖏᓐᓄᑦ, ᐃᒻᒪᖄᓗ ᖃᐅᒻᒪᕐᑯᑎᖏᓐᓄᑦ) ᐊᒻᒪᓗ

ᐅᓇᑕᖅᑐᒃᓴᐃᑦ ᐊᓐᓇᐅᒪᔾᔪᑎᒃᓴᖏᓐᓄᑦ. ᒪᕐᕉᒃ ᖃᓇᓯᐅᔭᒃᑯᑦ ᐊᑕᔪᑦ ᐊᖁᑎᒋᔭᐅᓗᑎᒃ ᑐᕌᖅᑕᐅᕗᑦ: ᓄᓇᒥ ᐆᓇᖅᑐᖃᐅᑎᖃᕐᕕᒃ ᒥᓪᓗᐊᕐᕕᖏᑦ ᐃᓂᖃᕐᑎᑦᑎᓗᑎᒃ ᐅᕐᑰᓴᐅᑎᓄᑦ ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᐆᓇᕐᓂᖓ ᐅᔭᖃᓂ ᐊᐅᔪᓐᓇᖅᑐᓕᐅᕐᕕᖏᑦ - ᐊᑐᖅᓯᓗᑎᒃ ᖁᐱᓯᒪᔪᓂ ᐃᑎᔪᑦ ᐃᒪᖃᐅᖅᑐᓂ - ᑐᕌᖅᑐᑦ ᐅᕐᑰᑎᑦᑎᔪᓐᓇᕐᒪᖔᑕ ᐊᒻᒪᓗ ᐆᒻᒪᖃᐅᑎᖃᐅᑎᖃᕐᑎᑦᑎᔪᓐᓇᕐᒪᖔᑕ.ᕿᓚᒻᒥᐅᔪᒃᑯᑦ ᑐᑭᓕᐅᕈᑕᐅᕙᓪᓕᐊᔪᑦ (2025-ᒥᑦ 2026-ᒧᑦ) ᐊᐅᓪᓗᑎᓗᒋᑦ ᑐᕌᖅᑕᐅᔪᑦ ᓂᐅᕕᐊᖑᔪᒪᓪᓗᑎᒃ. ᑕᒪᑐᒪᓂ ᐊᐅᔭᖅ ᐊᔪᐃᓐᓇᓇᐊᓪᓚᒍᑎᖃᕐᓂᐊᕋᑦᑕ ᐃᓗᐊᓂ 10 - ᑭᓚᒦᑕᔅ ᐊᕙᓗᓕᒫᖓ ᐃᖅᑲᓗᖕᓂ ᓄᐊᑦᑎᓗᑕ 20-30 ᐊᑐᖅᑕᐅᓂᐊᖅᑐᓂᒃ ᖄᖓᓂ ᐅᔭᖅᑲᓂᒃ ᖃᐅᔨᓴᖅᑕᐅᓂᐊᖅᑐᓂᒃ ᑕᒪᐃᓐᓂ ᖃᐅᓪᓗᖅᑐᑦ ᐅᔭᖅᑲᑦ ᐊᑖᓂᑦ, ᐃᖅᑲᖓᓂ ᐊᐅᓚᔅᔭᖅᑲᑦᑕᖅᑐᓂᒃ ᐊᒻᒪᓗ ᐳᑦᑕᓕᖅᑲᑦᑕᖅᑐᓂᒃ/ᖁᐱᓯᒪᔪᓂᒃ ᑐᑭᓯᓂᐊᕿᑦᑕ ᐆᓇᕐᓂᖓᑕ ᖃᓄᖅ ᐱᓕᕆᐊᖕᓂᖓ, ᐆᓇᖅᑐᒻᒪᓇᐋᓗᒃᐸᑦ ᐊᒻᒪᓗ ᖃᓄᖅ ᐃᔾᔪᑎᒋᐊ. ᐃᖏᓐᓇᖅ ᓴᕿᖃᑦᑕᖅᑐᑎᒍᑦ ᖁᐱᓯᒪᔪᓂᒃ ᖃᐅᔨᓴᕈᑎᑦ ᓄᓇᑐᐃᓐᓇᒥ ᑎᑎᖅᑕᐅᕙᓪᓕᐊᑎᐊᕐᓗᑎᒃ ᑐᑭᓯᓇᖅᓯᓂᐊᕐᒪᑕ, ᖃᓄᖅ ᐃᖅᐸᖅᓯᒪᑎᒋᕙᑦ, ᐳᑐᖏᑦ ᐊᒻᒪᓗ ᐊᑕᓂᖏᑦ ᓇᐅᒃᑯᑦ ᐊᕙᓗᐊᓂ ᐃᒪᖃᕐᓂᖃᖅᐸᑦ ᐊᒻᒪᓗ ᐃᒪᐃᑦ ᑰᖕᓂᖏᑦ ᐊᖁᑎᖏᑦ ᐊᑑᑎᖃᖅᐸᑦ ᐆᒻᒪᖁᑎᖃᐅᑎᒃᓴᓄᑦ ᖃᐅᔨᓴᕐᓗᒋᑦ. ᓯᕗᓂᐊᓂ ᐊᒻᒪᓗ ᑕᐃᑲᓂ ᓄᓇᒦᓪᓗᑕ ᐱᓕᕆᖃᑎᒌᑦ ᐱᓇᓱᖃᑎᖃᕐᓂᐊᖅᑐᑦ ᓄᓇᓕᖕᓂᒃ ᐊᒻᒪᓗ ᓄᓇᖃᖅᑳᖅᓯᒪᔪᑦ ᐊᐅᓚᑦᓯᔨᖏᓐᓂᒃ ᓴᓇᖃᑎᒌᓪᓗᑎᒃ ᐱᐅᓯᑐᖃᖏᓐᓄᑦ ᐊᑑᑎᖃᒻᒪᕆᓪᓕᑕ ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᑦ, ᐅᖃᐅᓯᐅᓗᑎᒃ ᑐᑭᓕᐅᕈᑕᐅᕙᓪᓕᐊᔪᑦ, ᐊᒻᒪᓗ ᐃᓚᓕᐅᑎᓗᒋᑦ ᓄᓇᓕᖕᓂ ᓯᕗᓪᓕᐅᑎᖅᑯᓯᔭᐅᔪᑦ ᐃᓂᖏᓂᒃ ᓂᕿᐊᖅᓯᑎᓪᓗᑕ ᐊᒻᒪᓗ ᐲᔭᕇᖅᐸᓪᓕᐊᔭᓂᒃ ᐸᕐᓇᐅᑎᓄᑦ. ᑕᒪᕐᒥᒃ ᓄᓇᒥ ᐱᓕᕆᐊᖑᔪᑦ ᐸᕝᕕᓴᐃᓐᖏᑦᑐᑦ (ᖄᖓᓂᒃ ᖃᐅᔨᓴᕈᑎᑖᕋᑦᑕ ᐊᒻᒪᓗ ᑕᑯᓐᓇᖅᑕᕗᑦ ᓄᓇᓐᖑᐊᓕᐊᕆᓪᓗᒋᑦ) ᐊᒻᒪᓗ ᐊᕝᕗᖅᑕᐃᓕᓪᓗᒋᑦ ᐊᑦᑕᕐᓇᖅᑑᔪᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᖏᑦᑎᒍᑦ. ᐊᑯᓂᐅᔪᒃᑯᑦ ᑐᑭᓕᐅᕈᑕᐅᕙᓪᓕᐊᔪᑦ (2026-ᒥᑦ 2030-ᒧᑦ) ᑐᕌᖅᑐᒍᑦ ᐊᖏᒡᓕᒋᐊᕐᓗᑕ ᐊᕕᒃᑐᖅᓯᒪᔪᑎᒍᑦ ᑐᑭᓯᓗᑕ ᐊᒻᒪᓗ ᓴᕿᑦᑎᓗᑕ ᐃᓱᒪᓕᐊᕆᔭᕆᐊᖃᖅᐸᕿᖅᑐᓂᒃ ᖃᐅᔨᓴᖅᓯᒪᔪᓂᒃ ᑲᔪᓯᔪᓐᓇᕐᒪᖔᑕ ᖃᐅᔨᓴᕈᑎᑦ ᐱᒋᐊᖅᑎᓪᓗᒋᑦ. ᐊᖏᓇᖅᑐᒍᑦ ᖃᐅᔨᓴᕈᑎᑦ ᓇᓗᓇᐃᖅᓯᔾᔪᑕᐅᖃᑦᑕᓯᓗᑎᒃ ᓈᓴᐅᑎᖏᑦᑎᒍᑦ ᓇᓚᐅᑖᖅᓯᒪᔭᑦ ᓄᓇᓪᓚᓂ ᓄᓇᐅᑉ ᐆᓇᕐᓂᖓ ᐅᔭᖃᓂ ᐊᐅᔪᓐᓇᖅᑐᖓ ᐅᔭᖃᖏᑦ, ᓂᕆᐅᓇᖅᓯᓗᑎᒃ ᐆᓇᕐᓂᖓᑕ ᖃᓅᕆᔭᕐᓂᖓ ᓄᓇᒥ ᐆᓇᖅᑐᖃᐅᑎᖃᕐᕕᒃ ᒥᓪᓗᐊᕐᕕᖏᑦᑎᒍᑦ ᖃᓅᑦᑕᖅᑎᖕᒪᕆᓪᓕᑕᓗ ᐊᐅᒍᓐᓇᓐᓇᖅᑐᑦ ᐊᒻᒪᓗ ᐆᓇᖅᑐᖃᖅᓯᓐᓂᖓ ᖃᓄᖅ ᐊᑦᐃᐊᑦ, ᐊᒻᒪᓗ ᐊᐅᔪᓐᓇᖅᑐᖓ ᑐᕌᖅᑕᑦ ᐃᓚᓕᐅᑎᓕᓗᑎᒃ ᖃᐅᔨᒪᖏᑦᑐᑦ ᐊᔪᖏᑎᑦᑎᔾᔪᑎᖏᑦ. ᖃᓇᓯᐅᔭᓕᕆᔾᔪᑎᖏᑦᑎᒍᑦ-ᒪᑭᒪᓇᓱᐊᕈᑎᓪᓗ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᒃ ᖃᐅᔨᓂᐊᕐᒪᑕ ᐊᑭᒋᓂᐊᖅᑕᖏᑦ ᑭᐊᒃᓴᐅᑎᒃᓴᖅ ᐊᒻᒪᓗ ᖃᐅᒻᒪᖁᑎᖃᐅᑎᖃᕐᕕᒃᓴᖅ, ᖃᓄᖅ ᐊᑯᓂᐅᑎᕿᔪᒥᒃ ᐊᑐᓴᓇᖅᐸᑦ, ᐱᔭᓴᓇᖅᑐᑦ ᐱᑯᓪᓗᒋᐊᓕᑦ ᐊᔪᕈᑎᑦ ᐅᑭᐅᖅᑕᖅᑐᒥ ᐃᖏᕋᓯᑦᑎᓇᓱᒡᒍᓂ, ᐊᑦᑕᕐᓇᕋᔭᖅᑐᑦ ᐋᕿᒃᑕᐅᓗᑎᒃ ᕿᓂᖅᑐᓄᑦ ᓂᐅᖅᑐᖅᒍᑎᒃ, ᐊᒻᒪᓗ ᖃᓄᐃᓕᖓᓂᖓᓄᑦ ᑲᒪᑎᖅᓯᒪᓂᖓ ᐊᒻᒪᓗ ᐆᑲᖅᑐᖅᓯᒪᔪᑦ, ᖁᐱᓯᒪᔪᖅᑎᑦ, ᖃᓃᑦᑕᖅᑎᖕᒪᕆᓪᓕᑕ ᓇᓯᐅᑎᖏᑦᑎᒍᑦ, ᑎᒍᒥᐊᖅᑎᐅᔪᑦ.ᖃᐅᔨᓴᕈᑎᑖᒡᒍᐊᕐᓂᐊᔪᑦ ᐊᐅᓚᑕᐅᑦᑎᐊᕐᓗᑎᒃ ᐊᒻᒪᓗ ᑐᓂᖁᖃᐅᑕᐅᓗᑎᒃ ᖃᐅᔨᒪᑦᑎᐊᕐᓂᐊᕐᒪᑕ ᓴᖅᑭᔮᑦᑎᐊᕐᓂᖓᓂᒃ, ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᑦ ᐱᑕᖃᖏᑦᑐᑦ ᐊᒻᒪᓗ ᓄᓇᓕᖕᓂ ᐊᕙᑎᖕᓂᒃ ᐊᑐᖅᑕᐅᕙᓪᓕᐊᔪᑦ. ᒫᓐᓇᐅᔪᖅᓯᒪᓕᑦᑎᐊᖅᑐᖅ ᖃᐅᔨᓴᕈᑎᑦ ᑲᑎᖕᒍᔪᑦ - ᐆᓇᕐᓂᖅᑐᑦ ᓄᓇᒥ ᐆᒃᑐᖅᓯᒪᔪᑦ, ᖁᐱᓯᒪᔪᖅᒥᑦ, ᖃᓅᑦᑕᖅᑎᖕᒪᕆᓪᓕᑕ ᓈᓴᐅᓯᖏᑦᑎᒍᑦ, ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᑦ ᑕᒫᓐᓇ ᐊᒻᒪᓗ ᐊᑦᑕᕐᓇᖅᑐᖃᖅᓯᒪᖏᑦᑐᑦ - ᐃᑦᑕᕐᓂᑕᖁᑎᖏᓐᓂᑦ ᑕᐃᑲᓂ ᐃᓕᓐᓂᐊᕐᕕᒃ ᑲᓇᑕᒥ ᑭᓪᓕᓯᓐᓂᐊᕆᓂᖅ ᖃᐅᔨᓴᖅᑎᓪᓗᓂ ᐊᒻᒪᓗ, ᐊᑖᓂ ᖃᐅᔨᕆᑦᑎᐊᖅᑕ ᐊᒻᒪᓗ ᐱᓇᓯᐊᖃᖅᓯᖕᓂᑕ ᕿᒥᕐᕈᐊᖅᑕᐅᓯᒪᔪᑦ, ᑭᓯᖅᓯᕐᓂᕐᓂ ᓄᓇ ᕿᕿᓄᓂ ᐊᒻᒪᓗ ᐅᐊᓐᓇᓗᓕᓂ ᓄᓇᐅᑉ ᐆᓇᕐᓂᖓ ᐅᔭᖃᓂ ᐊᐅᔪᓐᓇᖅᑐᖓ ᖃᐅᔨᓴᕈᑎᑦ ᓄᐊᓯᒪᔪᑦ ᐃᑲᔫᑎᓂᐊᖅᑐᑦ ᐊᑐᖅᑕᐅᖃᓐᓂᓴᓗᑎᒃ ᑕᒪᐃᓐᓂ ᐅᐊᖕᓇᖕᓕᓂ ᑲᓇᑕ. ᓂᕆᐅᓇᖅᑐᖅ ᑖᒃᑯᓇᖕᒌᖅᑐᑦ ᑑᒃᑖᒃᓴᑦ ᐃᓕᓐᓂᐊᕈᑎᒥᖕᒍᑦ ᑎᑎᖅᑲᑦ, ᐱᓇᓱᐊᖅᑎᖏᑦᑕ ᕿᒥᕐᕈᐊᖅᒍᒋᑦ [illegible] ᐅᑭᐅᖅᑕᖅ ᓄᓇᓕᖏᓂ.

Personnel

Personnel on site: 4
Days on site: 16
Total Person days: 64
Operations Phase: from 2026-07-23 to 2026-08-08

ᐱᓕᓐᐊᓐᓴᐅᓂᐊᖅᑐᑦ

ᓇᒥ	ᖃᓄᐃᓕᑦᑐᒥᑦ ᐱᓕᓐᐊᖃᖅᓂᐊᖅᐸ	ᑭᖑᓂᑦ ᓄᓇᖅᓯᒪᓂᖅ	ᑐᓴᐅᒪᔭᖑᑦ ᓄᓇᐅᐸ ᖃᓄᐃᓕᖅ ᐊᑐᑕᐅᓪᓚᐅᑦᑕᐅᖅᑎᓯᒪᔪᓐᓇᖅᓯᓂᖅ	ᐃᑦᓴᓂᓕᖃᖅᓴᐃᐅᓪᓚᐅᖅᐸ ᐃᓄᖅᓂᓄᑦ ᓇᔨᖅᑕᐅᖅᖃᑦᑕᓂᓂᑯᓐ ᑕᐃᑦᓯᒪᓂᑐᖃᐅᓕᖅᑐᖅ	ᖃᓄᓐᓂᖅᓱᖅ ᓄᓇᕈᑎᐅᔨᖅ ᐊᒻᒪᓗ ᓴᐳᒻᒥᔪᐃᐅᓪᓚᑲ ᓯᓇᓄᑦ
sampling area	Sampling sites	Municipal	The history of the site and the Iqaluit region reflects long-standing Inuit occupation, as well as more recent land use associated with seasonal travel, harvesting activities, and modern settlement.	The area may contain archaeological resources, including cultural remains or burial sites; as a precaution, all project activities will be planned to avoid such sensitive areas and maintain an appropriate protective buffer distance.	less than 10 km away from Iqaluit

ᓄᓇᕈᐅᐸ ᐃᓕᐅᖃᕈᐅᓂᖓ ᓄᓇᓕᓪᓗ ᐊᐃᑐᑐᖅᓯᒪᐅᓂᖓᓄᑦ ᐃᑲᔪᕈᐅᔨᓂᖓᓄᑦ

ᓄᓇᕈᑎᔨᖅ	ᐊᑎᑦ	ᑲᑐᔾᔨᐊᖃᖅᑎᑎᑎᔨᖅ	ᖃᓄᖅᑎᑕᐅᓯᒪᔪᓂᖓᓄᑦ ᑐᓴᐅᒪᔭᖑᑦ
ᐃᖃᓗᐃᑦ	Mark Antho	United for Literacy Nunavut	2026-04-01
ᐃᖃᓗᐃᑦ	Keith Drove and Jill Byrne	Nunavut Nukkiksautiit Corporation	2025-04-01
ᐃᖃᓗᐃᑦ	Christina Beland and Blaine Chislett	Nunavut Tunngavik	2026-03-06
ᐃᖃᓗᐃᑦ	Martha Lenio	Mars Green	2026-04-29

ᓀᐃᓴᓂᓪᓕᑦ ᐱᒍᖏᓐᓄᐅᑎ ᐊᖏᑕᖅᑕᐅᓯᒪᔪᓪᓕᑦ

ᓇᒻᒥᐊᖏᓂᓂᒃ ᐱᓕᕆᐊᕆᖏᓐᓄᐅᑦᑐᑦ ᑎᑎᕋᓗᓕᑦ:

South Baffin

ᓀᐃᓴᓂᓪᓕᑦ ᐱᒍᖏᓐᓄᐅᑎ ᐊᖏᑕᖅᑕᐅᓯᒪᔪᓪᓕᑦ

ᑲᓇᒪᒥᔨᐅᔪᓱᑦ ᐊᖑᑐᑐᖅᓯᒪᔨᓂᓂᓂ ᒪᓕᑲᕋᓂᒋᔪᓂᒃ ᐱᕋᖅᓯᓂᒋᔪᓂᓗ ᖃᒪᓕᑦ ᓀᐃᓴᓂᓯᒋᔪᓂᓗ ᑲᓇᒪᒥᓯᓗᓂᒃ	ᖃᓄᐃᑦᑐᓕᕆᓂᓇᓂᓂᓂ ᓀᐃᓴᓂᓯᒋᑕᐅᔪᖅ ᐱᔪᖏᓐᓄᐅᑕᐅᓯᒪᔪᖅ ᐊᖏᖅᑕᐅᔪᕋᓗᓂᒃ	ᐃᓕᓐᓇ ᖃᓄᐃᑦᑐᓕᕆᓂᓇᓂᓂ	ᐅᕙᓪᓕᒥ ᑐᓂᔪᖅ/ ᑐᓴᓂᖅᑐᑕᐅᓇᐅᖅᓯᒪᔪᖅ	ᑭᒡᓕᖃᕐᓇᖏᓐᓄᑦ
Nunavut Planning Commission	Permit describing our research and its contributions to Nunavut	Active	2026-04-26	
ᓄᓇᕗᒻᒥ ᖃᐅᔨᓴᖅᑐᓕᕆᔨᓄᑦᓯᑦ	Permit describing our research and its contributions to Nunavut	Applied, Decision Pending		

Project transportation types

Transportation Type	ᓯᓇᒧᑦ ᐊᑐᓚᐅᓂᐊᖅᓯ	Length of Use
Air	Direct flight from Ottawa to Iqaluit	
Land	We rented a car for deplacement within the sampling area provided.	

Project accomodation types

ᓄᓇᓕᒫᖅ

ᐊᓯᖏᓐᓄ,

ᐊᑐᓚᐅᓂᐊᖅᑐᖅ

ᐱᖏᑦ ᐊᖅᑎᔪᖅ ᐊᑐᖅᑕᐅᓂᐅᓴᔪᖅ ᐃᓕᖅᓱᐅᑎᓗᑎᑦ ᐃᓱᑕᐃᑦ, ᒥᓪᓗᐊᕿᑎᑦ, ᖁᖅᑲᑕᓱᖅ, ᓄᖓᓱᐅᑦ ᐊᓱᖅᑎᓪᓗ

ᐊᖅᑎᔪᖅ ᐱᖏᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᖅ ᖁᓄᐃᑦᑐᓂᖅ	ᖁᑦᓱᐅᐊᓪᑦ	ᐊᖅᑎᓂᖅᑎᑦ - ᐳᖅᑐᓂᖅᑎᑦ	ᓱᖓᒍᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᐸ
Geological Hammers	3	30 cm	For geological research, we will utilize a specialized geological hammer for surface sample collection, ensuring samples are hand-sized. This tool is designed to minimize environmental impact, allowing precise collection while preserving the delicate nature of the terrain.
vehicule	1	4200*1500*1700	Renting a small local vehicle is vital for efficient mapping in our designated area. Its compact size enables easy navigation through tight spaces. Choosing a local agency supports the community and provides insights into the terrain. This flexibility is crucial for adapting to our mapping needs, ensuring effective coverage.

ᑎᑎᕋᐅᓱᓚᐃᒍ ᐅᖅᓱᓴᐃᐸᑦ ᐊᑦᑕᓇᖅᑐᖅᑕᓂᓪᓗ ᐊᑐᖅᑕᐅᓂᐊᕐᓂᖅᑎᑦ

ᓱᖓᒍᑦ ᐅᖅᓱᓴᕐᓂᐊᖅᐸ	ᖁᖅᑲᑕᓪᑐᓭᓇᐅᓐᓄᑦ ᐅᖅᓱᓴᕐᓂᐊᖅ	ᖁᖅᑎᓱᐅᓐᓄᑦ ᐅᖅᓱᓴᖁᐅᑎᑦ	ᐃᓐᓴᐃᐅ ᐃᒪᖅᑎᑎᑕᐅᓪᓗᖅᓂᖅ	ᑲᑎᓂᓪᓗᒍ	ᐃᓐᓴᐃᑦ ᐊᒥᓱᓂᖅᑎᑦ	ᓱᖓᒍᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᐸ
Information is not available						

ᐃᒪᖅ ᐊᑐᖅᑕᐅᔨᒪᖅᑐᖅ

ᐅᓪᓗ ᑕᒪᖅ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᖅ	ᖁᓄᖅ ᐃᒥᖅᑕᖅᑕᕐᓂᐊᖅᐸᑦ	ᓇᑭᑦ ᐃᒥᖅᑕᖅᑕᕐᓂᐊᖅᐸᑦ
0	Drinking water available in the hotel (for cooking, drinking, showering)	Iqaluit Nunavut Research Institute accommodation.

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ᐱᓕᓐᐊᓐᔨᐅᕐᓴᕐᔪᒍᑦ ᐱᓕᓐᐊᓐᔨᐅᓂᐊᖅᑐᖅ	ᖃᓄᐃᐦᑐᖅ ᐊᑲᑕᑾᖅ	ᖃᓄᐃᑎᒋ ᐊᑲᑕᑾᑦ ᓴᖅᑭᐊᓂᐊᖅᑐᓐᔨᐅᐳᑦ	ᖃᓄᐃᖅ ᐊᑲᑕᖅᑕᐅᓂᐊᖅᐸ	ᓴᓗᒪᖅᓴᐅᑎᑲᓴᖅᓂᐅᓂᐊᖅᑐᑦ
Information is not available				

ᐊᐸᑎᒥᐅᑕᓂᖅᑐᑦ ᐊᑲᑐᖅᑕᐅᓯᒪᔪᑦ

Small rock samples will be collected, resulting in very low environmental impact. No drilling, excavation, or use of heavy machinery is planned. Potential impacts are minor and localized, including slight disturbance to surface materials and vegetation at sampling sites. Mitigation measures include conducting activities near existing roads and previously disturbed areas, avoiding environmentally and culturally sensitive sites (e.g., archaeological areas and cemeteries), limiting vegetation disturbance by targeting exposed bedrock outcrops only, and minimizing the number and size of samples collected. A strict “leave no trace” approach will be followed, including the removal of all waste. While immediate impacts are negligible, the study may contribute, in the longer term, to positive environmental and socioeconomic outcomes by improving knowledge of geothermal potential and supporting more informed energy decisions in Nunavut. This may also indirectly support employment opportunities, infrastructure planning, self-governance, and energy sovereignty.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

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Iqaluit is located on the southeastern coast of Baffin Island, within a sub-Arctic to Arctic climate characterized by long, cold winters and short, cool summers. The region is underlain by continuous to discontinuous permafrost, which strongly influences ground thermal regimes and subsurface hydrology. Surface conditions are dominated by tundra vegetation, thin soils, and widespread exposed crystalline bedrock of the Canadian Shield.Topography is generally low-relief but locally controlled by glacially scoured outcrops and frost-related processes. Seasonal freeze–thaw cycles affect near-surface stability, while snow cover and ice conditions vary significantly throughout the year. The area is also influenced by coastal processes from Frobisher Bay, including sea ice formation and tidal effects.Freshwater resources are limited to lakes and small streams, many of which are frozen for most of the year. Infrastructure development is constrained by permafrost, requiring adapted construction practices. Overall, the physical environment presents significant logistical and technical challenges for subsurface investigations and energy development.

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The biological environment around Iqaluit is characteristic of Arctic tundra ecosystems, with low biodiversity but high ecological sensitivity. Vegetation is dominated by mosses, lichens, grasses, and low-growing shrubs adapted to cold temperatures, shallow active layers, and nutrient-poor soils. Plant growth is limited to a short growing season, making recovery from disturbance slow.Wildlife includes terrestrial species such as caribou (notably the Baffin Island population), Arctic fox, and polar bear, although encounters near the city are occasional. The area also supports small mammals and a variety of migratory bird species during the summer breeding season.Marine and coastal ecosystems linked to Frobisher Bay are biologically productive and support species such as seals and fish, which are important for local subsistence. These ecosystems are closely tied to seasonal sea ice dynamics.Overall, Arctic ecosystems are particularly vulnerable to disturbance due to slow regeneration rates, strong seasonal constraints, and tight coupling between climate, permafrost, and biological activity.

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Iqaluit is the capital of Nunavut and serves as the primary administrative, economic, and transportation hub of the region. The population is predominantly Inuit, and local livelihoods are shaped by a mix of wage-based employment (government, services) and traditional land-based activities such as hunting, fishing, and harvesting.The community faces a high cost of living, driven by its geographic isolation and reliance on air and seasonal sea transport. Energy supply is almost entirely dependent on diesel generation, resulting in high energy costs, logistical vulnerability, and environmental concerns. As a result, there is strong interest in alternative and locally available energy sources.Infrastructure development is constrained by permafrost, limited road networks, and the absence of connections to southern electrical grids. Cultural

and archaeological considerations are central to any project in the region. Inuit knowledge plays an important role in land use planning, and certain areas may hold cultural significance or contain archaeological remains, requiring avoidance or careful management.

Miscellaneous Project Information

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The project involves surface fracture observations and small rock sample collection, resulting in very low environmental disturbance.Activities will be conducted near existing roads and previously disturbed areas, while avoiding environmentally and culturally sensitive sites (e.g., archaeological areas and cemeteries). No heavy equipment will be used, and sampling will be kept to a minimum.A strict “leave no trace” approach will be followed, including the removal of all waste. Research objectives and results will be shared with local communities.Overall, the project is expected to have negligible environmental and socioeconomic impacts.

Cumulative Effects

Given the small scale and short duration of the proposed activities, the project is not expected to contribute significantly to cumulative adverse environmental effects.Activities are limited to surface observations and small sample collection near existing roads, with no infrastructure development or long-term disturbance.However, the project may contribute positively at a cumulative level by improving knowledge of local geothermal potential, supporting more informed energy decision-making in Nunavut, where communities currently rely heavily on diesel.

Impacts

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	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
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Sampling sites		-	-	-	-	-	-	-	M	-	-	-	-		M	-	-	-	-		-	P	P	P	P
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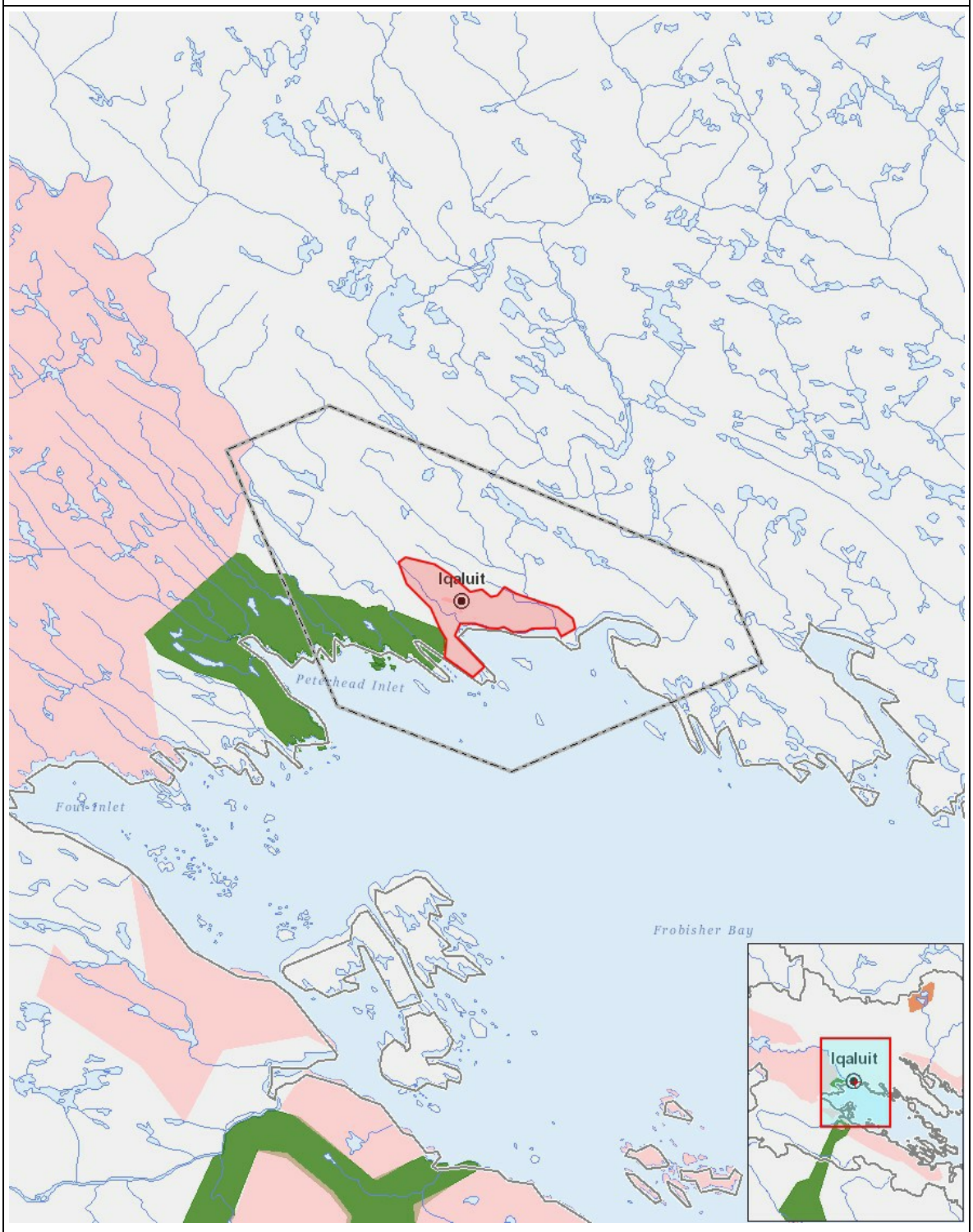

List of Project Geometries

1	polygon	sampling area