ᓄᓇᕗᒻ ᐊᐅᑎᓕᓇᕐᓂᖅ ᑲᑎᒪᔨᖏᑦᑎᐸᑦ ᑐᓴᖅᑐᑦ ᖃᐅᔨᖏᑦ #125781

Geothermal Energy Potential at Cambridge Bay and Resolute Bay

ᑐᓴᖅᑐᑕᐅᔪᖅ ᖃᓄᐃᑦᑐᓂᖅ:	New
ᐱᓕᓇᐊᓇᓴᐅᔪᒍᑦ ᖃᓄᐃᑦᑐᓂᖅ:	Scientific Research
ᐅᑉᓗᖏᑐ ᑐᓴᖅᑐᑕᑎᓕᐊᓂᐅᑦ:	3/15/2023 10:40:00 AM
Period of operation:	from 0001-01-01 to 0001-01-01
ᑲᔪᓯᓴᐃᐅᓂᐊᕐᓂᕆᓴᐅᔪᑦ:	from 0001-01-01 to 0001-01-01
ᐱᓕᓇᐊᖏᑭᒪᔪᖅ:	Derek Allerton Qulliq Energy Corporation (QEC) P.O. Box 250 Iqaluit Nunavut X0A 0H0 Canada ᐅᖃᓕᐅᑎᑦ: 8679797586, ᓯᓚᖅᓄᑦ: 8679797519

ᑐᓴᐅᒪᔭᒃᓴᑦ

ᖃᓄᐃᑦᑑᑎᓂᒃ ᐱᓕᕆᐊᖃᕐᓂᐊᕆᐊᖓᓐᓂᒃ

ᖃᓪᓗᓈᑎᑐᑦ: Qulliq Energy Corporation (QEC), formerly the Nunavut Power Corporation, is a 100% Government of Nunavut (NU) owned corporation that is the sole provider of electrical power in the Territory. The QEC currently provides power to the 25 communities in NU by operating (25) stand-alone diesel power plants in each, which means that it is dependent upon fossil fuels. However, the QEC is actively searching for new and renewable energy resources.Geothermal energy uses heat from within the Earth to produce heat and electricity with a much lower environmental impact than methods that burn hydrocarbons. Close to volcanoes, the subsurface water can be hot enough to efficiently produce electricity. In other locations the temperatures are lower, and it is most efficient to use the energy directly for heating for other applications. Subsurface temperatures in Northern Canada are high enough to make the direct use of heat to be a practical source of energy, but research is needed to determine how to best develop this type of energy resource. Information about the type of rock and water present underground is essential to guide geothermal energy development but is generally not available in NU.The University of Alberta is leading a major geothermal energy project that is active in many parts of Canada. The project has an emphasis on finding creating ways to supply energy needs of northern communities. The proposed research will use geophysical measurements to look under the surface to a depth of 2 km around the communities of Cambridge Bay and Resolute. These measurements will determine (1) the type of rock present, (2) the thickness of the frozen layer and (3) the amount and type of groundwater. Two geophysical exploration techniques will be used. The first is called magnetotellurics (MT) and uses a specialized radio receiver that measures natural radio signals coming from the atmosphere. Sensors attached to the instruments are buried in shallow holes dug with hand tools to a depth of 30 cm. The instrument is left to record data for 12-24 hours. The second technique measures the strength of gravity at each location and determines the thickness of rock layers. Measurements with both techniques will be made at a grid of points around each community.The studies at Cambridge Bay and Resolute will be made by a group of 4-5 people who will work for 10-14 days. The research team will be led by Martyn Unsworth, a professor of geophysics at the University of Alberta. The team will be looking for ways to engage with the community and explain how the work in 2023 will help the development of geothermal energy in Nunavut. Work at Cambridge Bay is planned for 2 weeks in July 2023 and at Resolute for 2 weeks in August 2023. At least one member of the group will be a member of the local community who will be employed to help with installation of instruments and as a wildlife monitor. The field group will not establish a camp and will be based in the communities.All measurement locations will be reached with vehicles and on foot. Figures 1 and 2 illustrate the areas in which the measurement will be taken.

ᐅᐃᕖᑎᑐᑦ: N/A

ᐃᓄᒃᑎᑐᑦ: ᖁᓪᓕᖅ ᖃᐅᒻᒪᖁᑎᓕᕆᔨᑦ ᐊᑎᖃᓚᐅᖅᑐᑦ ᓄᓇᕗᒻᒥ ᖃᐅᒻᒪᖁᑎᓕᕆᔨᑯᑦ ᓇᖕᒥᓂᕆᔭᐅᖕᒪᑕ 100 ᐳᓴᓐᒥᒃ ᓄᓇᕘᒥᐅᓄᑦ ᑯᐊᐳᕆᓴᖏᔭᐅᑉᓗᑎᒃ ᖃᐅᒻᒪᑎᑦᓯᔨᐅᔪᑦ ᓄᓇᓕᖕᓂᒃ 25 ᓄᓇᕗᒻᒥ ᐃᑯᒪᓂᒃ ᐅᖅᓱᐊᓗᒃᑐᖅᑐᓂᒃ ᐊᑐᕐᓗᑎᒃ. ᑭᓯᐊᓐᓂ ᖁᓪᓕᑯᑦ ᒪᓐᓇ ᕿᓂᕐᒪᑕ ᐊᓯᖏᓐᓂᒃ ᖃᐅᒻᒪᖁᑎᖃᕐᓂᕐᒥᒃ ᐅᖅᓱᐊᓗᒃ ᐊᑐᖕᒥᓂᖅᓴᐅᓕᕐᓗᓐᓂ.ᓄᓇᐅᑉ ᐊᑖᓐᓂᑦ ᖃᐅᒻᒪᖁᑎᖃᕐᓂᖅ ᐊᒃᑐᐃᓂᖃᓗᐊᖏᑐᖅ ᐊᕙᑎᑉᑎᖕᓂᒃ ᐅᖅᓱᐊᓗᖕᒥᒡᓗ ᐊᑐᓗᐊᖕᒥᓂᖅᓴᐅᔪᑕᐅᔫᓪᓗᐊᕐᓗᐊᕐᓗᓐᓂ. ᓄᓇᐅᑉ ᖃᓂᒋᔭᖓᓂᑦ ᐆᓇᖅᑐᒥᑦ ᓄᓇᒥᒃ ᐆᓇᕐᓂᖅᓴᐅᑎᑦᓯᖕᒪᑦ ᖃᐅᒻᒪᖁᑎᖃᕈᑕᐅᔫᓪᓗᐊᕐᓗᐊᕐᓗᓐᓂ. ᐊᓯᖏᓐᓂᓕ ᑭᓯᐊᓐᓂ ᐆᓇᓗᐊᖏᓂᖅᓴᐅᑉᓗᓐᓂ, ᐊᓯᖏᓐᓂᒃ ᖃᐅᒻᒪᖁᑎᓂᒃ ᐊᑐᕈᑕᐅᔫᓪᓗᐊᕐᒪᑦ. ᓄᓇᐅᑉ ᖃᖓᓐᓂᑦ ᐆᓇᕐᓂᖅ ᐅᑭᐅᖅᑕᖅᑐᒥ ᐊᑐᕈᑎᖏᓐᓂᒃ ᐱᑕᖃᕐᓂᖅᓴᐅᖕᒪᑦ, ᑭᓯᐊᓐᓂ ᖃᐅᔨᓴᒐᐅᑲᓂᕆᐊᖃᖅᑐᖅ ᐱᐅᔪᒻᒥᒃ ᐱᑕᖃᕋᔭᕐᓂᖓᓐᓂᒃ ᖃᐅᒻᒪᖁᑎᑕᐅᓂᐊᖅᑐᑦ. ᑐᑭᓯᑲᓂᕈᑎᑦ ᐊᑐᒐᐅᔫᓪᓗᐊᕐᒪᑕ ᓄᓇᐅᑉ ᐊᑖᓐᓂᑦ ᐅᔭᕋᖕᓂᒃ ᐃᒥᕐᒥᒃᓗ ᖃᐅᔨᒪᓗᓐᓂ ᐱᕙᓪᓕᐊᔪᑎᖏᓐᓂᒃ ᖃᐅᒻᒪᖁᑕᐅᓇᔭᖅᑐᑦ ᐅᑉᓗᒻᒥ ᓄᓇᕘᒻᒥ ᐱᑕᖃᖏᒪ.ᐃᐅᐳᐊᑕ ᐃᓕᓂᐊᕕᒡᔪᐊᖓ ᓯᕗᓕᖅᑎᐅᕗᖅ ᓄᓇᒻᒥᑦ ᖃᐅᔨᒪᖁᑎᖃᕐᓂᕐᒥᒃ ᐃᓂᖅᑎᐅᑉᓗᑎᒃ ᑲᓇᑕᒻᒥ. ᑕᑉᑯᐊ ᓇᓂᓯᓂᓗᖕᓂᐊᕐᒪᑕ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓄᓇᓖᑦ ᖃᐅᒻᒪᖁᑎᓂᒃ ᐊᑐᕈᖕᓇᖅᑕᖏᓐᓂᒃ. ᖃᐅᔨᓴᕈᑕᐅᓂᐊᖅᑐᖅ ᓄᓇᒻᒥᒃ ᐊᑐᕐᓗᑎᒃ ᐊᑖᓐᓂ ᕿᓂᕐᓂᐊᕐᒪᑕ ᐊᑦᑎᖕᓂᐊ 2 ᒦᑐᔅ ᐃᖃᓗᒃᑑᑎᐊᒥ ᐊᒻᒪ ᖃᐅᓱᐃᑦᑐᒥ. (1) ᖃᓄᐃᑐᓂᒃ ᐅᔭᕋᖕᓂᒃ ᐱᑕᖃᕐᒪᖔᑦ ᖃᐅᔨᓴᓂᓗᖕᓂᐊᖅᑐᑦ (2) ᓄᓇᑉ ᕿᕿᓂᖓ ᖃᓄᖅ ᐃᑉᔪᑎᒥᖕᒪᖔᑦ, ᐊᒻᒪ (3) ᓄᓇᐅᑉ ᐊᑖᓐᓂ ᐃᒥᖅ ᖃᓄᐃᑑᖕᒪᖔᑦ. ᒪᕈᖕᓂᒃ ᖃᐅᔨᓴᕈᑎᖃᕐᓂᐊᕐᒪᑕ, ᓯᕗᓪᓕᖅ ᐊᑎᖃᖅᑐᖅ ᓄᓇᐅᑉ ᓂᐱᓐᓇᖅᑐᖓ ᐊᑐᖅᑕᐅᓗᓐᓂ ᓈᓚᐅᑎᑦ ᑑᓴᓗᑎᒃ ᓯᓚᒻᒥᑦ. ᖃᐅᔨᓴᕈᑎᑦ ᐃᓕᔭᐅᓯᒪᓗᑎᒃ ᓄᓇᐅᑉ ᐊᑖᓐᓂᑦ 30 ᓯᓐᑎᒦᑐ ᓄᓇᒻᒥᑦ. ᖃᐅᔨᓴᕐᓂᐊᖅᑐᑦ 12ᒥᑦ 24ᒧᑦ ᐃᑲᕋᓂᒃ. ᑐᓃᖓ ᓴᖏᓂᖓᓐᓂᒃ ᓄᓇᐅᑉ ᓂᐱᓐᓇᖅᑐᖓᑕ ᐅᔭᕋᐃᑦ ᖃᐅᔨᓴᕈᑕᐅᓗᑎᒃ. ᓄᓇᓕᐅᑉ ᖃᓂᒋᔭᖓᓂ ᓴᖏᓂᖏᓐᓂᒃ ᖃᐅᔨᓴᕐᓂᐊᖅᑐᑦ.ᖃᐅᔨᓴᕐᓂᖅ ᐃᖃᓗᒃᑑᑎᐊᒥ ᐊᒪ ᖃᐅᓱᐃᑦᑐᒥ 4 ᐊᒪ 5 ᖃᐅᔨᓴᖅᑎᑦ ᐅᑉᓗᓂᒃ 10 ᐊᒪ 14 ᐃᓗᐊᓂ ᐱᓕᕆᓂᐊᕐᓗᑎᒃ. ᖃᐅᔨᓴᖅᑎᑦ ᐃᓱᒪᑕᖃᕐᓂᐊᖅᐳᑦ ᒪᐋᑎᓐ ᐊᓐᐳᐊᔅᒥᒃ, ᐅᔭᕋᒃᑕᕆᐊᖑᔪᖅ ᐃᐅᐳᐊᑕᑉ ᐃᓕᓂᐊᕕᒡᔪᐊᖓᓂ. ᖃᐅᔨᓴᖅᑎᑦ ᓄᓇᓕᖕᒥᒃ ᐃᓚᐅᑎᑦᓯᓂᓗᖕᓂᐊᖅᑐᑦ ᐅᖃᐅᓯᖃᕐᓗᑎᒃᓗ 2023 ᐱᓕᕆᐊᖑᓂᐊᖅᑐᓂᒃ ᓄᓇᒻᒥᑦ ᖃᐅᒻᒪᖁᑎᖃᕐᓂᕐᒥᒃ ᓄᓇᕘᒻᒥ. ᐱᓕᕆᓂᐊᖅᑐᑦ ᐃᖃᓗᒃᑑᑎᐊᒻᒥ ᐱᓇᓱᐊᕈᓯᕐᓂᒃ ᒪᕈᖕᓂᒃ ᔪᓚᐃ 2023 ᐊᒻᒪ ᖃᐅᓱᑦᑐᒥ ᐱᓇᓱᐊᕈᓯᕐᓂᒃ ᒪᕈᖕᓂᒃ ᐊᐅᒍᓯ 2023. ᐃᓚᖓᑦ ᖃᐅᔨᓴᖅᑏᑦ ᓄᓇᓕᖕᒥᑦ ᐱᓂᐊᖅᑐᖅ ᖃᐅᔨᓴᕈᑎᓂᒃ ᐃᓕᓯᓂᐊᕐᓗᓐᓂ ᐊᒻᒪ ᓂᕐᔪᑎᓂᒃ ᖃᐅᔨᓴᖅᑎᐅᓗᓂ. ᐱᓕᕆᕝᕕᖃᓕᖏᑐᑦ ᓄᓇᓕᖕᒧᑦ ᖃᓂᓗᐊᕐᓂᖕᒪᖕᒍᑦ ᑭᓯᐊᓐᓂ ᓄᓇᓕᖕᓂᑦ ᓯᓂᒃᑕᖅᑕᕐᓂᐊᖅᑐᑦ.ᑕᑉᑯᐊ ᑕᒪᕐᒥᒃ ᐊᒃᓴᓗᐊᓕᒃᑯᑦ ᐱᓱᒡᓗᓂᓗ ᑎᑭᑕᐅᔫᓪᓗᐊᖅᑐᑦ. ᐊᔨᖑᐃ 1 ᐊᒻᒪ 2 ᑎᑎᕋᖅᓯᒪᕗᒃ ᖃᐅᔨᓴᒐᐅᔫᒫᖅᑐᓂᒃ.

Inuinnaqtun: Qulliq Alruyaliqiyit Kuapuriissait (QEC), hivuani ilihimayauvaktut taimaa Nunavunmi Qulliliqiyit Kuapuriissat, 100%-mik Kavamatkunnit Nunavunmi (NU) nanminiriyait kuapuriissauyut inmittuat alruyaliqiyiuyut Aviktuqhimayumi. QEC-kut tajja qulliqaqtittivaktut 25-nut nunallaarnut Nunavunmi aulapkaiplutik (25) avaliittunik makitayunik uqhuqyuaqtuqtunik huanngautinik tamangnik, talvuuna uqhuqyuaqturialgit. Kihimi, QEC-kut tajja qiniqhiahimmaatut nutaanik nutaannguqtaqtuniklu qulliqtuutighanik.Nunaminngaaqtut huanngautit uunaqtumik nunaminngaaqtuq uunnaghiiyaamik alruyaqturiamiklu avatinut mihingnaqpallaanngittumik ahiagut taapkua ikulattiyut paurnik. Qanittut qagaqtarviinut nunnam, qaangani imaq uunnaghimalaaqtuq ihuaqtukkut qulliqturnaqhitiyaamik. Ahinit nayugaqnit niklamatqiyauvaktuq, taimaalu ihuatqiyauyuq huanngautituriamik atauttikkut uunnaghiiyaamik ahinit atuqtaghanit. Qaangani nunnam ukiuqtaqtumi Kanatami naammaktumik uunnakpaktuq aturiamingnik uunaqnianik huanngautighatut, kihimi qauyihaqtauyughat huli qanuq nakuuniqhakkut hanavalliayaamik hapkuninnga huanngautighanut pivighanik. Naunaitkutat qanurittaaghat uyarak imaqlu nunnam iluani iharianaqtuq ilihaqpaalliriamik nunaminngaaqtumit uunaqutighanik kihimi hailihimayunik huittuqaqtuq Nunavunmi.Ilihaqpaalliqviat Alberta-mi hivuliqtiuyut angiyumik nunaminngaaqtumik huanngautighanut havaaghanik havakpaktut amihunit nayugaqnit Kanatami. Havaaghat hapkua qiniqhiahimmaaqpaktut havauhighanik qulliqtuqtittiyaamik ukiuqtaqtumiunut nunallaarnut. Tughirautauyut qauyihautighat nunaminngaaqtunit qauyihainiaqtut qiniriamik ataani nunnam itiniqaqtumik 2 km-nik avatiinik nunallaat Iqaluktuuttiaq Qauyuittuqlu. Hapkua qauyihaqhimayut ihumaliurutauniaqtut taapkuninnga (1) qanurittunik uyaraqariaghaat, (2) hilingnia qiqumayutuqaq taimaalu (3) aktinia qanuritaaghaalu imaq. Malruk nunaminngaaqtunik qauyihautinik atuqniaqhimayut. Hivulliq taiyauvaktuq magnetotellurics (MT) atuqpaghutik ahiittunik naalautinik qauyihaivaktut naalautikkut ilittuqhitinik hilaminngaaqtunik. Qauyihautit atatayut ingilrutainut hauyauvaktut pukkittunit hauhimayunit hanalrutikkut taimaa itiniqaqtunik 30 cm-nik. Ingilrutik qimaktauvaktuq nipiliuriamik naunaitkutaghanik hivituyumik 24-nik ikaaqninik. Aippaa havauhiq qauyihaivaktuq hakugingnianik nunaliviat tamangnit nayugaqnit ihumaliurutigivagaallu hilingnianik uyaqqat. Qauyihaivangniat tamangnik havauhiit atuqhugit qauyihaqvighainit avatiinit nunallaat.Qauyihaqtaunahuat Iqaluktuuttiaqmi Qauyuittuqmiklu havaqatigiingnit 4-5-nik inungnik havaqatigiigniaqtut 10-14-nikluuniit uplunik. Qauyihaiyit havaqatigiit hivuliqtiqarniaqtut Martyn Unsworth-mik, ilihaiyiryuanguyuq nunaminngaaqtunik uunaqtunik Ilihaqpaalliqvianit Alberta-mi. Havaqatigiit havauhighaqhiuqpangniat ilaupkaiyaamik nunallaarmiut qauhitilugit qanuq havaaghait 2023-mi ikayuutauniariaghaat hanayunik nunaminngaaqtunik huanngautighanik Nunavunmi. Havaaghat Iqaluktuuttiaqmi parnaiyaqhimayuq aulaluni 2 weeks-mik July 2023-mi Qauyuittumiu 2 weeks-mik August 2023-mi. Atauhiugaluaq qauyihaiyunut havaqatauyuq nunallaarmiutauniaqtuq ikayuqtighaq iliuraiyunik ingilrutinik anngutighaniklu qiniqhimaluni. Maniraqmi havaktut hiniktarviqalaittut havakviqarluaqlutik nunallaarnit.Tamangnik qauyihaqvighait tikitauvangniat nunakkuurutikkut pihughutiklu. Piksautit 1 taamnalu 2 iittuqhitiyuq nayugaqnik qauyihaqvighainik.

Personnel

Personnel on site: 5

Days on site: 14

Total Person days: 70

Operations Phase: from 2023-07-01 to 2023-08-31

ᐱᓪᓇᐊᓇᒃᑲᐅᓂᐊᖅᑐᑦ

ᓇᒥ	ᖃᓄᐃᓕᒋᑎᑦ ᐱᓪᓇᐊᖅᑲᓂᐊᖅᐸ	ᑭᒃᑯᑦ ᓄᓇᖅᑯᒋᓂ	ᑐᓴᐅᒪᔨᒃᓴᑦ ᓄᓇᐅᑦ ᐊᑐᓴᐅᓪᓚᐅᖅᑲᓂᐊᖅᓱᒃᑐᒃ	ᐃᑦᓴᖅᓂᑦᖃᖅᐊᐅᓪᓚᐅᖅᐸ ᐃᓄᖕᓄᑦ ᓇᔨᖅᑕᐅᖅᖃᑦᑕᖅᓯᓪᓗᓂ ᑕᐃᑦᓯᒪᓂᑐᖅᖃᓪᓚᕐᓗᒍ	ᖃᓄᐃᓕᒋᑎᑦ ᓄᓇᕐᑭᐅᔪᖅ ᐊᒻᒪᓗ ᓴᓪᒥᑎᒃᐊᐅᓪᓚᐅᖅᓯᓪᓗᓂ ᓯᓇᓄᑦ
QEC_Proposed_Cambridge_Geophysics_Area_n83z13_20220207	Researching	Municipal	All activities will be contained within the Municipal boundaries of the Hamlet of Cambridge Bay.	There is a low potential for archaeological/paleontological artifacts/sites to be discovered as all of the activities will be located within the Hamlet of Cambridge Bay. In the event an artifact/site is discovered work in the area will halt and the Project Supervisor will immediately contact the Hamlet and the GN Department of Culture and Heritage. Nothing will be removed, disturbed, or displaced at any archaeological/paleontological site	Within the Municipal boundaries of the Hamlet of Cambridge Bay
QEC_Proposed_Resolute_Geophysics_Area_n83z15_20220207	Researching	Municipal	All activities will be contained within the Municipal boundaries of the Hamlet of Resolute.	There is a low potential for archaeological/paleontological artifacts/sites to be discovered as all of the activities will be located within the Hamlet of Resolute. In the event an artifact/site is discovered work in the area will halt and the Project Supervisor will immediately contact the Hamlet and the GN Department of Culture and Heritage. Nothing will be removed, disturbed, or displaced at any archaeological/paleontological site.	Within the Municipal boundaries of the Hamlet of Resolute.

ᓄᓇᓕᐅᑦ ᐃᓕᐅᖅᑕᐅᓂᖓ ᓄᓇᓵᓪᓗ ᐊᐱᑐᑦᓯᒪᐅᖅᓂᖓᓄᑦ ᐃᑲᔪᑕᐅᔪᓐᓇᖅᑐᓂᖅᑐᑦ

ᓄᓇᓕᒋᔭᖅ	ᐊᑎᑦ	ᑲᑐᔾᔨᐊᖅᑎᑎᒋᓕᖅ	ᖃᓄᖕᓇᓗᓪ ᑐᓴᐅᒪᔨᒃᓴᑦ ᓄᓇᕐᑭᐅᔪᖅ ᐊᒻᒪᓗ ᓴᓪᒥᑎᒃᐊᐅᓪᓚᐅᖅᓯᓪᓗᓂ ᓯᓇᓄᑦ
ᖃᐅᔨᐃᓕᑐᖅ ᑭᓴᓕᒃ	Nancy Amarualik	Resolute Bay Hunters and Trappers Association	2022-05-17
ᖃᐅᔨᐃᓕᑐᖅ ᑭᓴᓕᒃ	Nancy Amarualik	Resolute Bay Hunters and Trappers Association	2022-06-04
ᖃᐅᔨᐃᓕᑐᖅ ᑭᓴᓕᒃ	Ian Dudla	Hamlet of Resolute Bay	2022-06-04
ᖃᐅᔨᐃᓕᑐᖅ ᑭᓴᓕᒃ	Mark Amarualik	Hamlet of Resolute Bay	2022-10-19
ᐃᖃᓗᐊᔪᓕᔪᖅ	Jim MacEachern	Hamlet of Cambridge Bay	2023-03-15
ᐃᖃᓗᐊᔪᓕᔪᖅ	Angela Gerbrandt	Hamlet of Cambridge Bay	2023-03-16
ᐃᖃᓗᐊᔪᓕᔪᖅ	Derek Elias	Kitikmeot Inuit Association	2023-03-16

ᓇᐃᔭᖅᑎᑦ ᐱᒍᓐᓇᐅᑎ ᐊᖏᖅᑕᐅᓂᒪᔪᑦ

ᓇᒥᒋᐊᖅᓯᓂᖅ ᐱᓕᓇᐊᓇᖅᓴᐃᐅᓂᐊᖅᑐᑦ ᑎᑎᕐᕕᓂᑦ:

Kitikmeot
North Baffin

ᓇᐃᔭᖅᑎᑦ ᐱᒍᓐᓇᐅᑎ ᐊᖏᖅᑕᐅᓂᒪᔪᑦ

ᑲᓴᒪᒋᐅᐅᔨᑦ ᐊᐱᕆᑐᕐᔨᓂᖅᓯᓂ ᒪᓕᑦᑰᖅᓴᓂᕆᓂᖅ ᕿᒪᒃᓴᑦ ᐱᔪᓐᓇᐅᑎᑕᐅᓂᖅ ᓇᐃᔭᖅᑎᓂᓕᖅᑐᑦ	ᖃᓄᐃᔅᑐᑦᓯᓇᐅᓴ ᓇᐃᔭᖅᓂᑕᑕᐅᔪᖅ ᐱᔪᓐᓇᐅᑎᑕᐅᔪᖅ ᐊᖏᖅᑕᐅᔪᖅᑕᖅᓯᑦ	ᐃᓕᓴᐅ ᖃᓄᐃᔅᑐᓂᖅᓴᓂᓴ	ᐅᓪᓗᒥ ᑐᓂᔅᖃᑦ/ ᑐᓴᕐᖃᑐᒃᑯᓇᐅᓂᖅᓂᒪᔪᖅ	ᑭᓪᓕᖃᖅᐸᖅᓴᒃ
ᓄᓇᕗᑦ ᓴᓐᒪᖅᓴᒃ, ᖃᓄᐃᓕᖅᖢᑕᓇᓕᕆᔨᑦ	Scientific Research Licence Application for Physical / Natural Sciences Research	Not Yet Applied		

Project transportation types

Transportation Type	ᓂᓇᒧᑦ ᐊᑐᓚᐅᓂᐊᖅᐸᑦ	Length of Use
Land	Travel by truck, All Terrain Vehicles and on foot to all measurement locations	

Project accomodation types

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ᐱᖁᑦ ᐊᖏᔪᖅ ᐊᑐᖅᑕᐅᓂᐅᕆᔪᖅ ᐃᓕᖅᓱᐅᑎᓗᒋᑦ ᐃᑯᑕᐃᑦ, ᒥᑦᓗᐊᑭᑎᑦ, ᖁᖕᒪᑕᓱᖅ, ᓄᓇᓱᐅᑦ ᐊᓱᖏᑦᓗ

ᐊᖏᔪᖅ ᐱᖁᑦ ᐊᑐᒪᐅᓂᐊᖅᑐᖅ ᖁᓄᐃᑦᑐᓕᖅᒪ	ᖁᖅᑦᓱᐅᕐᓂᑦ	ᐊᖏᓂᖏᑦ - ᐳᖅᑐᓂᖏᑦ	ᓱᓇᒧᑦ ᐊᑐᒪᐅᓂᐊᖅᓯ
Hand Tools	various	various	Various Hand tools to conduct Geophysical work
Truck or ATV	1-2	Pick up	Transport personnel to geophysical measurement locations

ᑎᑎᕆᐅᓱᓇᓗᒍ ᐅᖅᓯᓴᕐᐃᑦ ᐊᑦᑕᓇᖅᑐᖅᑕᓪᓕᓗ ᐊᑐᖅᑕᐅᓂᐊᕐᓂᖏᑦ

ᓱᓇᒧᑦ ᐅᖅᓯᓴᕐᒥᐊᖅ ᐊᑐᒪᐅᓂᐊᖅᓯ	ᖁᓄᐃᑦᑐᓕᖅᑕᐃᑦᓯᓇᐅᓪ ᐅᖅᓯᓴᕐᓂᐊᖅ	ᖁᖅᑦᓱᐅᕐᓂᑦ ᐅᖅᓯᓴᕐᖅᑐᑎᑦ	ᐃᓴᓴᐃᑦ ᐃᒪᓕᖅᑐᑦ ᐃᒪᖅᖁᖅᓯᓂᖅᓴᖅ	ᖃᑎᒌᓗᒍ	ᐃᓴᓴᐃᑦ ᐊᒥᓱᓂᖏᑦ	ᓱᓇᒧᑦ ᐊᑐᒪᐅᓂᐊᖅᓯ
Information is not available						

ᐃᒪᖅ ᐊᑐᖅᑕᐅᔨᒪᖅᑐᖅ

ᐅᓪᓗ ᑕᒪᖅ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᖅ	ᖁᓄᖅ ᐃᒥᖅᑕᖅᑕᕐᓂᐊᖅᓯᑦ	ᓄᑭᑦ ᐃᒥᖅᑕᖅᑕᕐᓂᐊᖅᓯᑦ
0		

ᐊᑲᑕᔪᑦ

ᐊᑲᑕᔪᓕᓂᐊᕐᓂᖅ

ᐱᓕᓇᐊᓇᔭᐅᔾᔨᒪᔨᒍᑦ ᐱᓕᓇᐊᓇᔭᐅᓂᐊᖅᑐᖅ	ᖃᓄᐃᕐᑐᖅ ᐊᑲᑕᔪᖅ	ᖃᓄᑎᒋ ᐊᑲᑕᔪᑦ ᓴᖅᑭᐊᓂᐊᖅᑐᓇᔭᐅᔾᑦ	ᖃᓄᖅ ᐊᑲᑕᖅᑕᐅᓂᐊᖅᓯ	ᓴᓗᒪᖅᓴᐅᑎᑲᓴᑲᒃᓂᐅᓂᐊᖅᑐᑦ
Researching	ᐊᑲᑕᔪᑦ ᐃᓱᐊᓪᑕᑕᐅᔾᔨᓐᓇᖅᑐᑦ	Minimal	The small amount of meal and paper waste produced during each shift can be disposed of at the personnel accommodations.	A policy of bring whatever you brought in with you, out with you will be enforced.

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There are no potential environmental impacts anticipated to occur with the implementation of the proposed Project activities .

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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Proximity to protected areas, including:i.designated environmental areas, including parks; The Project activities will be located within the municipal boundaries of the Hamlets of Resolute and Cambridge Bay. The nearest territorial park to Cambridge Bay is the Ovayuk Territorial Park, approximately 15 km east. The Queen Maud Gulf Migratory Bird Sanctuary is located about 75 km south of Cambridge Bay, across the Queen Maud Gulf. Tuprvik Territorial Park is within the municipal boundaries of Resolute Bay, 5 km north of the Resolute Bay Airport.ii.heritage sites; The ruins of a Dorset or Tuniit longhouse is within the municipal boundaries of Cambridge Bay.iii.sensitive areas, including all sensitive marine habitat areas; The Project is located within the municipal boundaries of Resolute Bay and Cambridge Bay.iv.recreational areas;The Tuprvik Territorial Park Campground is within the municipal boundaries of Resolute Bay.v.sport and commercial fishing areas; N/A. Will not be affected by this project.vi.breeding, spawning and nursery areas; N/A. Will not be affected by this project.vii.known migration

routes of terrestrial and marine species; N/A. Will not be affected by this project.viii.marine resources; N/A. Will not be affected by this project.ix.areas of natural beauty, cultural or historical history; All efforts will be made to respect and preserve all natural, cultural or historical resources.x.protected wildlife areas; andN/A. Will not be affected by this project.xi.other protected areas.There are no other protected areas within the project area.Eskers and other unique landscapes (e.g. sand hills, marshes, wetlands, floodplains):QEC considers all landscapes to be critical to the natural environment and as such all areas of the Project area will be treated with care and respect. Any seemingly unique and fragile landscapes will be avoided.Evidence of ground, slope or rock instability, seismicity:N/A. Will not be affected by this project.Evidence of thermokarsts:N/A. Will not be affected by this project.Evidence of ice lenses:N/A. Will not be affected by this project.Surface and bedrock geology:The bedrock geology of Cambridge Bay is generally comprised of Lower Paleozoic sedimentary rocks of the Arctic Platform (dolostone, limestone, sandstone, shale, intraclast conglomerate and breccia). Bedrock outcrops are rare in and around the Hamlet. Surficial geology of Cambridge Bay area generally comprised of either glacial till veneer or blanket, consisting of mainly sand and some gravel varying in thicknesses between 1 m and over 5 m in depth over the bedrock, with locally interbedded meltwater deposits.The bedrock geology of Resolute Bay is generally comprised of Lower Mesozoic sedimentary rocks. Bedrock outcrops are rare in and around the Hamlet. Surficial geology of Resolute Bay area generally comprised of undifferentiated regolith, consisting of fine sand to clay diamicton which may include rubble and felsenmeer; variable thickness derived predominately from weathering of bedrock; may include areas of bedrock mixed with till locally. Topography:Cambridge Bay is located within the Amundsen Gulf Lowlands Ecoregion of the Northern Arctic Ecozone. The hamlet of Cambridge Bay is situated on an extensive rolling plateau that gently rises from steep coastal cliffs. The terrain is dotted with innumerable lakes and ponds. Resolute Bay is located within the Parry Islands Plateau Ecoregion of the Northern Arctic Ecozone. The terrain near Resolute Bay has rocky coastal bluffs and gravel flats along its shoreline, with rolling hills, deposits of glacial moraine and several small lakes nearby.Permafrost (e.g. stability, depth, thickness, continuity, taliks):Cambridge Bay and Resolute Bay are underlain by deep, continuous permafrost with medium ice content, and abundant ice wedges.Permafrost occurs continuously throughout the Northern Arctic Ecozone. Lying sometimes just a few centimetres below the surface, it acts as a dam that stops the downward flow of water. Consequently, even though there is little precipitation here, the soils are often waterlogged or frozen. Repeated freezing and thawing of these soils creates interesting features on the surface, including cell-like polygons, bulging hummocks, and bare mud boils where the soil is so active that no plants can take root. Intense frost heaving often splits apart the underlying bedrock and forces large angular boulders to the surface.Sediment and soil quality:Flat areas are dominated by felsenmeer and cryoturbated soils. Cryoturbation produces features such as frost boils, ice-wedge polygons, stone nets and stone stripes.•Hydrology/ limnology (e.g. watershed boundaries, lakes, streams, sediment geochemistry, surface water flow, groundwater flow, flood zones):The Project is located within the Resolute and Cambridge Bay community water source watersheds. The watersheds will not be affected by this project.Tidal processes and bathymetry in the project area (if applicable): N/A. Will not be affected by this project.Water quality and quantity:N/A. Will not be affected by this project.Air quality:N/A. Will not be affected by this project.Climate conditions and predicted future climate trends:The Project areas are characterized by a sub arctic climate with temperature extremes of minus 40° C in the winter to plus 30° C in the summer. The microclimate is very unpredictable and daily temperatures can change rapidly. The biggest single difficulty in the summer is the common occurrence of fog banks forming in the morning and persisting until noon. Total annual precipitation is usually less than 200 mm in both Resolute and Cambridge Bay.Noise levels:N/A. Will not be affected by this project.•Other physical Valued Ecosystem Components (VEC) as determined through community consultation and/or literature review:None known at this time.

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Vegetation (terrestrial as well as freshwater and marine where applicable):Cambridge Bay has dwarf tundra vegetation, consisting of dwarf birch, willow, northern Labrador tea, Dryas spp (e.g. mountain avens), and Vaccinium spp. (e.g., blueberry, cranberry), Tall dwarf birch, willow, and alder occur on warm sites; wet sites are dominated by willow and sedge.Resolute has sparse and discontinuous vegetation cover of moss, along with mixed low-growing herbs and shrubs such as purple saxifrage, arctic willow and Dryas spp., kobresia, sedge, and arctic poppy.Wildlife, including habitat and migration patterns:Characteristic wildlife around Resolute and Cambridge Bay includes muskox, caribou, arctic hare, arctic fox, snowy owl, rap tors, polar bear, seal, seabirds and waterfowl. The proposed activities will not interfere with wildlife, their habitat or migration patterns.Birds, including habitat and migration patterns:The proposed activities will not interfere with bird habitat and migration patterns.Species of concern as identified by federal or territorial agencies, including any wildlife species listed under the Species at Risk Act (SARA), its critical habitat or the residences of individuals of the species:QEC recognizes that with any project, there is a potential for activities to negatively affect wildlife, and of greatest concern, affect species at risk. According to the Environment and Climate Change Canada (ECCC) Species at Rick Public Registry, there are 22 Schedule 1 species at risk protected under the Species at Risk Act that may occur in or have ranges that overlap with portions of the Nunavut Territory. This includes species such as: caribou, polar bear, ivory gull, buff-breasted sandpiper, red knot (islandic and rufa subspecies), peregrine falcon, barn swallow, and short-eared owl to name a few. Suitable habitat for a number of these species, such as caribou and polar bear are known to occur in the vicinity of both Resolute and Cambridge Bay. However, the potential for schedule 1 species to be found within the project areas is anticipated to be low.Aquatic (freshwater and marine) species, including habitat and migration/spawning patterns:The proposed activities will not interfere with marine species. Other biological Valued Ecosystem Components: None known at this time.

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Proximity to communities:The Project is to be conducted within the municipal boundaries of Resolute and Cambridge Bay.Archaeological and culturally significant sites (e.g. pingos, soap stone quarries) in the project (Local Study Area) and adjacent area (Regional Study Area):The ruins of a Dorset or Tuniit longhouse is just outside the main community area of Cambridge Bay. No measurement locations will be selected in this area, and any other areas of archaeological and/or culturally significance. The company is not aware of any known archaeological and/or culturally significant sites within the project area of the Hamlet of Resolute.Palaeontological component of surface and bedrock geology:The company is not aware of any known palaeontological sites.Land and resource use in the area, including subsistence harvesting, tourism, trapping and guiding operations:The Project is to be conducted within the municipal boundaries of Resolute and Cambridge Bay and therefore will not have any impact to the cultural value of the area, including subsistence harvesting, tourism, trapping and guiding operations.Local and regional traffic patterns:This Project will not have any affect on local or regional traffic patterns.Human Health, broadly defined as a complete state of wellbeing (including physical, social, psychological, and spiritual aspects):This Project is not anticipated to have any affect on human health.Other Valued Socioeconomic Components (VSEC) as determined through community consultation and/or literature review. None known at this time.

Miscellaneous Project Information

For additional information see:Non-Technical Summary for Cambridge Bay & Resolute Bay Geothermal Project – English; Non-Technical Summary for Cambridge Bay & Resolute Bay Geothermal Project – Inuktitut; Non-Technical Summary for Cambridge Bay & Resolute Bay Geothermal Project – Inuinnaqtun; Cambridge Bay Proposed Geophysical Survey Area Figure; Resolute Bay Proposed Geophysical Survey Area Figure

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PHYSICAL AND BIOLOGICALDesignated Environmental Areas:N/A. Will not be affected by this project.Ground Stability:N/A. Will not be affected by this project.Permafrost:N/A. Will not be affected by this project.Surface Water Hydrology:N/A. Will not be affected by this project.Water Quality:N/A. Will not be affected by this project.Climate Conditions:N/A. Will not be affected by this project.Eskers and Other Unique or Fragile Landscapes:N/A. Will not be affected by this project.Surface and Bedrock Geology:N/A. Will not be affected by this project.Sediment and Soil Quality: N/A. Will not be affected by this project.Tidal Processes and Bathymetry: N/A. Will not be affected by this project.Air Quality:N/A. Will not be affected by this project.Noise Levels:N/A. Will not be affected by this project.Vegetation and Wildlife Habitat:NA. Will not be affected by this project.Wildlife and Birds (including habitat and migration patterns):Wildlife can be disturbed by noise or human interaction. Disturbance can cause stress-induced health problems and mortality. Mitigation procedures for reducing the impact of activities on wildlife will include, but not be limited to the following:- All personnel will be trained on wildlife-human interaction/encounters procedures.- Wildlife sightings will be recorded, and this information will be passed on to other members of the crew;- Proper storage of garbage, food and any other potential attractants will be ensured to avoid exposure to wildlife;- All personnel will be aware of, and will follow, wildlife deterrence techniques (including proper storage and disposal of food) to reduce the possibility of attracting wildlife;- All personnel will have bear safety training and will be aware of the penalties for shooting polar bears, even in self defense.SOCIO-ECONOMICArchaeological and cultural historic sites:There is a low

potential for archaeological/paleontological artifacts/sites to be discovered as all of the activities will be located within the Hamlets of Resolute and Cambridge Bay. In the event an artifact/site is discovered, work in the area will halt and the Project Supervisor will immediately contact the Hamlet and the GN Department of Culture and Heritage. Nothing will be removed, disturbed, or displaced at any archaeological/paleontological site. Employment:QEC believes that it is essential to develop the project in cooperation with local communities. The proposed geophysical program will look to employ at least one member of the local community to help with installation of instruments and as a wildlife monitor. Local employment benefits individuals and families in isolated communities which may have few opportunities. This in turn boosts the local economy.Community wellness:Whenever possible, goods and services will be sourced from local businesses. QEC is committed to engaging communities in an open and honest manner and would appreciate and consider any and all knowledge, advice and input received. With proper mitigation, the project should not affect land and water use, traditional use or cultural resources.Human Health:The proposed project will have no impact to local human health.

Cumulative Effects

There are no cumulative effects anticipated by the implementation of the project.

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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ᐃᑐᑦᑎᓇᓂᖅ																									
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(P = ᐊᖅᐅᓇᕈᑎᐸᓵᓐᓂᖅᑐᑦ, N = ᐊᖅᐅᖅᑭᐸᓯᑕᐅᐸᓵᓐᓂᖅᑐᑦ ᑕᓪᓕᒪᓂᐸᓯᖅᓂᑕᐅᐸᓵᖅᑭᑦᓯᓗ, M = ᐊᖅᐅᖅᑭᐸᓯᑕᐅᐸᓵᓐᓂᖅᑐᑦ ᑕᓪᓕᒪᓂᐸᓯᖅᓂᑕᐅᐸᓵᓐᓂᖅᑐᑦᓯᓗ, U = ᖃᐅᐅᔨᒪᓵᓐᓂᑭᑦᑐᖅ)

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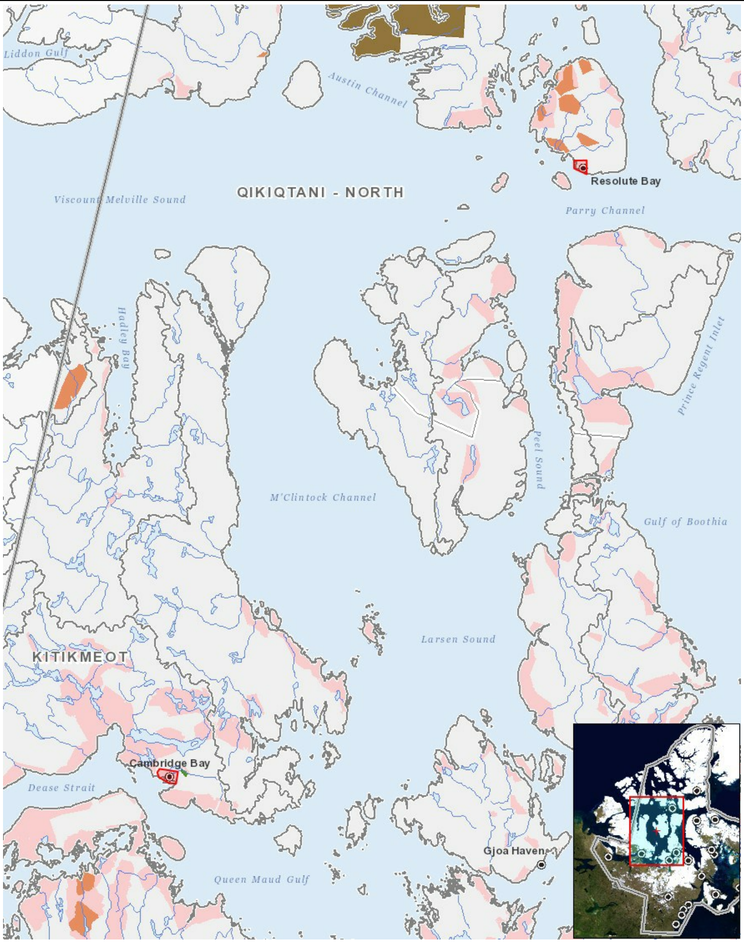

List of Project Geometries

1	polygon	QEC_Proposed_Cambridge_Geophysics_Area_n83z13_20220207
2	polygon	QEC_Proposed_Resolute_Geophysics_Area_n83z15_20220207