

**Demande de la CNER faisant l'objet d'un examen préalable #125406**  
**Concept Advancement for a Raw Water Intake**

# DÉTAILS

## Description non technique de la proposition de projet

Anglais: PROJECT DESCRIPTION With increased demand on the City of Iqaluit's drinking water supply, the City's Lake Geraldine drinking water reservoir needs more water. The initial plan to pump water from the Apex (Niaqunguk) River to the Lake Geraldine reservoir was cancelled due to a limited amount of water available. This required identification of a new water source, and water intake sites, to be chosen. Nunami completed a desktop study for the City of Iqaluit and identified that the Sylvia Grinnell River had enough water to meet the City's needs while still protecting important Arctic Char habitat in that river. To move forward with preliminary engineering and design of a water intake at the Sylvia Grinnell River, Nunami needs to complete a field study to identify the best possible intake location. Nunami is planning to complete the field study in September 2018 to measure the depth to bedrock on the shoreline where pumping equipment might be located. Two sites along the Sylvia Grinnell River, but outside (north) of the Sylvia Grinnell Territorial Park are to be investigated. These are Site A and Site B on the attached map. At each site, depth to bedrock will be measured on-land, on the shore of the Sylvia Grinnell River, and water depth across the river will also be measured. The two sites will be accessed with a truck or ATVs using existing roads and trails. No structures will be built and very little land disturbance is expected. METHODSTo identify the best intake site on the Sylvia Grinnell River, the following methods will be used: 1. Bathymetry Survey: Nunami will use a small remote-controlled boat to measure the depth of water across the two sites in the Sylvia Grinnell River. The boat is battery-powered and controlled by an operator on shore. 2. Geotechnical Survey: Nunami will measure the depth to bedrock without digging or disturbing the ground. This will be done on the land at each of the two sites along the Sylvia Grinnell River. Nunami will use sound and pressure waves to map the type of material below ground surface. The sound and pressure waves are generated by low-speed blast charges from special array cables laid out on the ground surface. Geophones are installed along the cables to receive the sound and pressure waves bounced-back from the material below ground surface. The data are interpreted by technicians and used to map the material types below ground surface. Depth to bedrock will be mapped over an area up to 100 square metres along the shore, and upgradient, of the Sylvia Grinnell River. No geotechnical survey work will occur within the river and these on-shore low-velocity blast charges are not expected to cause any serious harm to fish in the river. DATA USEIn the short-term, Nunami will use the data to identify the best site for a water intake in the Sylvia Grinnell River for the City of Iqaluit. In the long-term, data will be stored on Nunami's servers and will be given to the City of Iqaluit. REPORTINGNunami will communicate the results of the study to the City in a report. Results of the study will likely be communicated by the City of Iqaluit through a public meeting. The study will not result in a publication.

Français: DESCRIPTION DU PROJETLa ville d'Iqaluit a connu une augmentation de sa demande en eau potable depuis les dernières années et cette augmentation signifie que les réserves du réservoir du lac Géraldine qui alimente la ville d'Iqaluit en eau potable doivent être ajustées à la hausse pour fournir à la demande. Le premier projet visant à remédier à cette situation devait puiser dans les ressources de la rivière Apex (Niaqunguk), mais a été annulé dû à un niveau d'eau insuffisant dans la rivière. Plusieurs autres sources ont été étudiées par la suite et la rivière Sylvia Grinnell a été identifiée par Nunami comme une rivière ayant des ressources suffisantes pour accommoder la demande croissante en eau potable dans la ville d'Iqaluit tout en assurant la protection de la population d'ombles chevaliers et de son habitat naturel. Pour initialiser le processus de conception, Nunami conduira, en septembre 2018, une étude qui déterminera le site idéal pour la prise d'eau à la rivière Sylvia Grinnell. Deux sites ont été identifiés : site A et site B qui sont tout deux situés au nord du parc territorial Sylvia Grinnell et identifiés sur la carte jointe à ce document. L'installation des pompes nécessaires pour la prise d'eau étant prévue d'être située près de la rive, la profondeur du fonds marin y sera évaluée de la surface au substrat rocheux. Une mesure similaire sera prise sur la terre ferme ainsi qu'au milieu de la rivière. L'accès au site sera restreint aux routes et chantiers par l'entremise d'un camion ou d'un véhicule tout-terrain. Aucune infrastructure ne sera construite et l'impact sur l'environnement devrait être minime. PROCÉDURELes procédures suivantes seront suivies pour identifier le site de la prise d'eau à la rivière Sylvia Grinnell: 1. Levée bathymétrique: Nunami utilisera un bateau à batterie miniature contrôlé de la rive par un opérateur pour mesurer la profondeur des eaux aux deux sites identifiés. 2. Étude géotechnique: Nunami prendra des mesures sur la profondeur du substrat rocheux sans creuser ou perturber le sol en utilisant des ondes sonores et barométriques pour identifier les différents matériaux qui constituent le sol entre la surface et le substrat rocheux. Les ondes seront générées par des charges lancées à basse vitesse à travers une grille de câbles étendue sur le sol aux endroits visés. Des géo-récepteurs seront utilisés pour capter les ondes retournées par les différentes composantes du sol. Les données seront par la suite interprétées par des techniciens sur place qui procéderont par la suite à définir les différentes composantes du sol et leur profondeur respective. La profondeur du substrat rocheux sera illustrée sur une surface allant jusqu'à cent mètres carrés sur le long de la rive. L'étude géotechnique se fera uniquement sur la terre ferme où les charges lancées à basse vitesse ne devraient pas causer de dommage à la vie aquatique dans la rivière. Ces techniques seront utilisées aux deux sites identifiés précédemment. UTILISATION DES DONNÉESÀ court terme, Nunami identifiera le site idéal pour la prise d'eau de la rivière Sylvia Grinnell pour le réservoir de la ville d'Iqaluit. À long terme, ces

[illegible]

Operations Phase: from 2018-09-05 to 2018-09-20

## Activités

Emplacement	Type d'activité	Statut des terres	Historique du site	Site à valeur archéologique ou paléontologique	Proximité des collectivités les plus proches et de toute zone protégée
Site A	Scientific/International Polar Year Research	Municipal	A 2018 feasibility study examined Site A for potential use as a raw water intake	Unknown	Site A is situated within the municipal limits of the City of Iqaluit
Site B1	Scientific/International Polar Year Research	Municipal	A 2018 feasibility study examined Site B1 for potential use as a raw water intake	Unknown	Site B1 is situated within the municipal limits of the City of Iqaluit
Site B2	Scientific/International Polar Year Research	Municipal	A 2018 feasibility study examined Site B2 for potential use as a raw water intake	Unknown	Site B2 is situated within the municipal limits of the City of Iqaluit

### Engagement de la collectivité et avantages pour la région

Collectivité	Nom	Organisme	Date de la prise de contact
Iqaluit	Manasie Mark	Amaruq Hunters and Trappers Association	2018-08-01
Iqaluit	Michael	Amaruq Hunters and Trappers Association	2018-08-16

# Autorisations

Indiquez les zones dans lesquelles le projet est situé:

South Baffin

## Autorisations

Organisme de régulation	Description des autorisations	État actuel	Date de l'émission/de la demande	Date d'échéance
Institut de recherche du Nunavut	Scientific Research Licence	Applied, Decision Pending		

## Project transportation types

Transportation Type	Utilisation proposée	Length of Use
Air	Access to Iqaluit, by out-of-town field personnel (up to two) will be via commercial scheduled flights	
Land	Access to Site A, Site B1, and Site B2 will be overland on existing roads and trails, via truck and ATV	

## Project accomodation types

Collectivité

## Utilisation de matériel

Équipement à utiliser (y compris les perceuses, les pompes, les aéronefs, les véhicules, etc.)

Type d'équipement	Quantité	Taille – Dimensions	Utilisation proposée
ATV	4	4 x 3 ft	For access to Site A and Site B (1 & 2) along the Sylvia Grinnell River; transportation within the community
Truck	1	15 x 6 ft	Access/transportation within Iqaluit
Geotechnical Equipment	200 lbs	Unk.	Includes sledge hammer, cables, geophones, low-speed blast charges; to complete geotechnical survey at Site A and Site B
Remote-controlled boat	1	3 x 6 ft	Remote-controlled survey boat, battery-powered, equipped with depth sounding and survey equipment; to complete bathymetric surveys at Site A and Site B

Décrivez l'utilisation du carburant et des marchandises dangereuses

Décrivez l'utilisation de carburant :	Type de carburant	Nombre de conteneurs	Capacité du conteneur	Quantité totale	Unités	Utilisation proposée
Diesel	fuel	0	50	0	Liters	Fueling of rental truck (if diesel truck used); only to be completed at in-town fueling stations
Gasoline	fuel	0	40	0	Liters	Fueling of ATVs and rental truck (if gasoline truck used); only to be completed at in-town fueling stations - no re-fueling out near the Sylvia Grinnell River or on existing trails

Consommation d'eau

Quantité quotidienne (m3)	Méthodes de récupération de l'eau proposées	Emplacement de récupération de l'eau proposé
0		

# Déchets

## Gestion des déchets

Activités du projet	Type des déchets	Quantité prévue	Méthode d'élimination	Procédures de traitement supplémentaires
Scientific/International Polar Year Research	Déchets combustibles	< 1 cubic metre	Domestic waste, from field personnel lunches and inert blast caps following the geotechnical survey, will be disposed of via Iqaluit's municipal waste collection system.	n/a

### Répercussions environnementales :

Environmental impacts associated with the field study are expected to be negligible. The sites will be accessed using existing roads and trails via ATV and/or truck. The ATVs will be equipped with small spill kits to manage any small spills or leaks that may occur. The non-intrusive geotechnical survey will not cause any ground or land disturbance and the remote-controlled, battery-powered survey boat, used in the river, will be clean of any potential contaminants before entering the river. Potential fisheries effects from the geotechnical survey are also expected to be minimal and not cause residual serious harm to fish. Erosion and sediment control measures will be used to reduce the risk of erosion of bank sediments into the river, or the potential for run-off from the survey area to enter the river. All geotechnical work will also occur on-land (not in the river) and geotechnical blast charges will be low-speed and, as a result, below known thresholds that cause effects to fish (i.e., Linton et al. 1985, DFO 2010).

# **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**

### **Description de l'environnement existant : Environnement physique**

**SITE A** Site A is at the end of the Iqaluit Airport (YFB) runway and near the northern border of the Sylvia Grinnell Territorial Park. The site is a deep run following a riffle and located on a gradual bend to the west. The channel is approximately 150 m wide and river's thalweg is poorly pronounced but running in the middle of the channel. Substrates consist of large coarse material, primarily large cobble and boulders. A bedrock outcrop is present and is the site of the WSC hydrometric station 10UH001. The outcrop protrudes into the flow path slightly and it was noted that this protrusion was not sufficient to induce scour in the bed substrate. Erosion of the left bank is minimized by the presence of the outcrop. **SITE B** Site B (1 and 2) is a run located on a more pronounced outside bend of the river. The left (north) bank at Site B is actively eroding and would require stabilization for any infrastructure placed at this site. A bedrock outcrop is present downstream and that outcrop runs under the thalweg at a shallow depth. It is anticipated that the outcrop provides some limit to the progression of erosion at left bank. Bed substrates consist of cobble and large gravel with the occasional boulder. The high banks are comprised of loose gravel and sand and the extent of the bedrock in the left bank is unclear. The river's thalweg is moderately pronounced and runs near the outside of the bend. At the time of the site visit (August 2017), a depth of 1.5 m was measured near the thalweg. Its potential depth may also be limited by the downstream bedrock. The channel is 130 m wide but the shallow slip-off slope on the inside of the bend (right [south] bank) suggests flood flow is not confined at this location and may further limit the deepening of the thalweg by existing processes. The profile of the bend suggests the thalweg will never run up against the toe of the bank and the observed depth of the thalweg may be at its limit without the addition of training structures.

### **Description de l'environnement existant : Environnement biologique**

The Sylvia Grinnell River supports an anadromous population of Arctic char (Gallagher and Dick 2010). Arctic char (*Salvelinus alpinus*) exhibit anadromous and freshwater resident populations and are found in rivers, lakes, estuaries, and marine environments throughout their life cycle (Evan et al. 2002). Anadromous Arctic char that are part of the fishery in the area migrate to marine waters during the summer to feed and return to freshwater habitats to overwinter and spawn. Arctic char use the Sylvia Grinnell River for migration, overwintering, spawning and rearing; however, it is believed that most char likely overwinter and spawn in Sylvia Grinnell Lake. Personal communication with DFO (C. Lewis, 21 August 2017) indicate that large deep pools in the Sylvia Grinnell River are also used for overwintering. The Arctic char population in the Sylvia Grinnell River is an important resource for subsistence and recreation of people in Iqaluit (DFO 2013). Unfortunately, current stock abundance estimates are not available for the Sylvia Grinnell Arctic char. During a 2009 to 2011 mark-recapture study by DFO, insufficient fish were recaptured and estimates could not be developed (DFO 2013b). DFO is currently completing a five-year study to evaluate stock status of Sylvia Grinnell Arctic char; the study is expected to be complete by 2020 (Ducharme 2016). There has been some concern about the Arctic char population in the Sylvia Grinnell River due to historical exploitation. A commercial fishery was attempted in the late 1940s and late 1950s, at the Sylvia Grinnell estuary (in addition to subsistence and recreational fishing), however the fishery was closed due to declining catch-per-unit-effort (CPUE) and smaller-sized fish (Kristofferson and Sopuck 1983; Gallagher and Dick 2010). An assessment of the stock in the late 1970s indicated that it had not yet recovered from the exploitation in the 1940s and 1950s, based on the size and age composition of the stock, and it was thought that current subsistence and recreational fishing rates were likely preventing recovery (Kristofferson and Sopuck 1983). More recent assessments in 2002 and 2004 suggest some recovery of the stock since the late 1970s, based on

increased length-at-age, increased mean weight, longer and older fish, reduced mortality rates, and improved CPUE (Gallagher and Dick 2010). The 2009 to 2011 DFO mark-recapture study found some recovery of the stock from the 1970s/1980s, based on the stock age structure, and estimated age-at-maturity (8 to 9 years) and proportion of reproductive fish (DFO 2013b). However, it is believed that the population has not yet returned to that of the late 1940s when a large portion of the population was estimated between 12 and 23 years of age (DFO 2013b). SITE A Site A has a riffle flowing into a deep run associated with backwater formed from gravel deposits upstream of a bedrock intrusion on the east bank. The river channel is approximately 150 m wide at the bedrock intrusion. Water depth is primarily less than 1 m, with depths exceeding 1 m in the backwater and likely in locations in the main channel. Substrates consist of large coarse material, primarily large cobble and boulders with bedrock intrusions. Substrates in the backwater had a deposition layer of fine sediment. Deep backwater pool habitat along the east bank, upstream of the WSC hydrometric station may provide habitat for downstream migrating young Arctic char and the backwater pool may provide rearing habitat for Arctic char and habitat for small fish, such as stickleback species. Site A is unlikely to provide overwintering habitat to adult Arctic char due to shallow water depths. SITE B Site B is run habitat along the east bank, turning into a riffle, then a rapid formed at the downstream end where a bedrock intrusion narrows the channel. Sub-site B1 and B2 are adjacent, with B2 being upstream at the mid-point of the bend and B1 being at the lower portion of the bend. The channel is approximately 130 m wide. Along the middle and upstream portions of the east bank, substrates consist of cobble and large gravel, with high loose gravel banks. Occasional boulders provide instream cover. Site B is unlikely to provide overwintering habitat due to low water depth, nor act as a holding pool for upstream migratory Arctic char. Nearshore habitat would provide cover for downstream moving fish, but rearing habitat is poor because of the absence of cover.

### **Description de l'environnement existant : Environnement socio-économique**

Site A and Site B (1 and 2) are situated within the municipal limits of the City of Iqaluit. Iqaluit has been ranked as the fastest growing community in Nunavut, and between 2001 and 2006, was among the top 15 fastest growing communities in Canada (City of Iqaluit 2010). The Nunavut Bureau of Statistics (2014) provides population projections, currently based on the 2011 Canadian census, and estimates a 5.5% population increase in Iqaluit over the next five years, from 2018 to 2022 (from 7,881 individuals, to 8,318). However, based on the 2016 Canadian census, Iqaluit has already experienced a 15.5% population increase between 2011 and 2016, from 6,699 individuals (2011) to the current estimate of 7,740 individuals (Statistics Canada 2017). Based on the 2016 Canadian census (Statistics Canada 2017), the unemployment rate in Iqaluit is 9.6%. Of the workforce 15 years of age and older (5,675 individuals), 74% are employed and the primary occupations include those in education, law, social, community and government services (935 individuals), as well as business, finance and administration (915 individuals), and sales and service (795 individuals).

### **Miscellaneous Project Information**

### **Identification des répercussions et mesures d'atténuation proposées**

Environmental impacts associated with the field study are expected to be negligible. The sites will be accessed using existing roads and trails via ATV and/or truck. The ATVs will be equipped with small spill kits to manage any small spills or leaks that may occur. The non-intrusive geotechnical survey will not cause any ground or land disturbance and the remote-controlled, battery-powered survey boat, used in the river, will be clean of any potential contaminants before entering the river. Potential fisheries effects from the geotechnical survey are also expected to be minimal and not cause residual serious harm to fish. Erosion and sediment control measures will be used to reduce the risk of erosion of bank sediments into the river, or the potential for run-off from the survey area to enter the river. All geotechnical work will also occur on-land (not in the river) and geotechnical blast charges will be low-speed and, as a result, below known thresholds that cause effects to fish (i.e., Linton et al. 1985, DFO 2010).

### **Répercussions cumulatives**

No cumulative effects from the Project are expected given its short duration and negligible environmental impacts

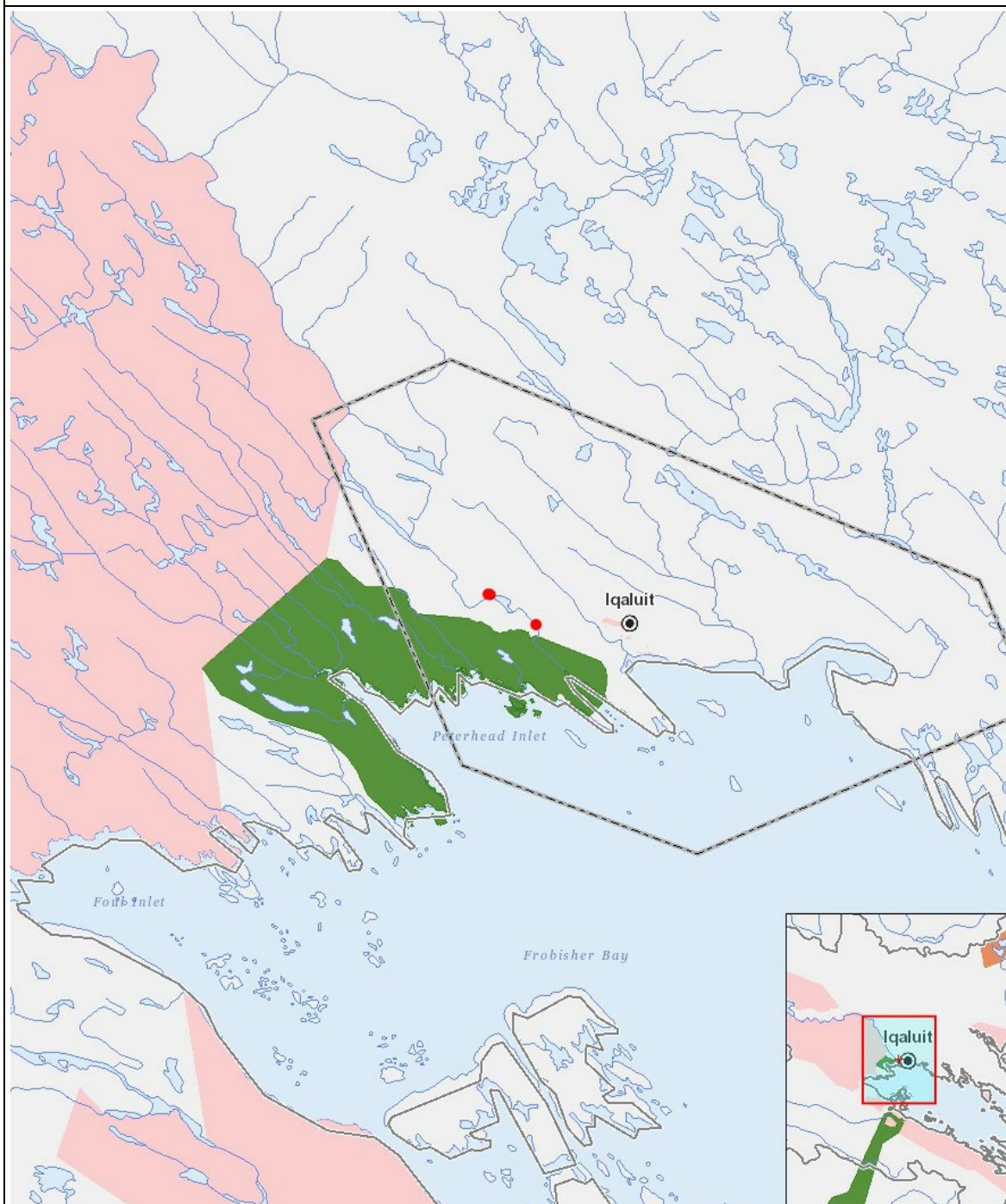
# Impacts

## Identification des répercussions environnementales

	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
Construction																									
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-
Exploitation																									
Scientific/International Polar Year Research		-	-	-	-	-	N	-	-	-	N	-	-	-		-	-	-	N	-		-	-	-	-
Désaffectation																									
-		-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-

(P = Positive, N = Négative et non gérable, M = Négative et gérable, U = Inconnue)

## PROJECT MAP



### LIST OF PROJECT GEOMETRIES:

1	point	Site A
2	point	Site B1
3	point	Site B2