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LONG-TERM FEASIBILITY OF THE NANISIVIK NAVAL FACILITY

Lieutenant-Commander Ryan Bunt

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Solo Flight

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By Lieutenant-Commander Ryan. Bunt

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INTRODUCTION

In the early 2000s, there was growing concern over climate change opening up the Arctic and posing a risk to Canadian sovereignty, the Russians were claiming vast swaths of the Arctic by planting flags on the sea bed at the North Pole, and the disagreement with Denmark over Hans Island was still front page news.[1] This evoked the traditional Canadian defensiveness over the Arctic, and led to a *use it or lose it* approach by the Government.[2] In response, the Canadian Armed Forces (CAF) conducted the first annual Operation NANOOK exercise in 2007, and Prime Minister Harper announced plans to construct the Nanisivik Naval Facility (NNF) and Arctic and Offshore Patrol Ships (AOPS) that same year.

Located at the northern tip of Baffin Island, the NNF would provide the Royal Canadian Navy (RCN) with a support facility north of the Arctic Circle in a strategic location near the eastern entrance to the Northwest Passage. While viable sites for an Arctic port were limited, Nanisivik had the advantage of a natural deep harbour with an existing port facility left over from an abandoned zinc mine.[3] The NNF project was originally intended to enter service in 2014 and include a year-round fuelling station supported by a jet-capable airstrip.[4] After several schedule delays and increasing costs,

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[1] Guy Faulconbridge, "Russian sub plants flag under North Pole," *Reuters*, 2 August 2007. https://www.reuters.com/article/idINIndia-28784420070802.
[2] Kristin Bartenstein, "Use it or lose it: An appropriate and wise slogan?," *Institute for Research on Public Policy*, 1 July 2010. https://policyoptions.irpp.org/fr/magazines/immigration-jobs-and-canadas-future/use-it-or-lose-it-an-appropriate-and-wise-slogan/.
[3] Sylvain Lescoutre, "Forward Operating Location Nanisivik: Halifax's Gateway to Canada's Arctic," *Canadian Military Journal* 13, no. 1 (2012): 67-68.
[4] Jim Bell, "Nanisivik: Nunavut's incredible shrinking naval facility," *Nunatsiaq News*, 22 March 2012. https://nunatsiaq.com/stories/article/65674nanisivik_nunavuts_incredible_shrinking_naval_facility/.

the project was descoped to an uninhabited, seasonal fuelling station with no airstrip. The project will not be completed until at least 2022.[5]

Since the announcement of the NNF project, climate change has continued to foster increasing interest in the Canadian Arctic for its natural resources and shipping routes, as demonstrated by the recent Chinese Polar Silk Road policy.[6] Commercial shipping traffic within the Canadian Arctic has increased considerably in recent years with the number of miles sailed increasing 107% from 2013 to 2019.[7] As a result, the need for the RCN to operate in the Arctic remains entrenched in Canada's defence policy, albeit in a surveillance, environmental protection and support to other government departments (OGD) role. Since 2007, the infrastructure landscape of the Arctic has changed through the construction of a deep-sea port in Iqaluit, renewed investment in the Port of Churchill, and the construction of an all-weather road to Tuktoyaktuk. The pace and scale of change within the region call into question the validity of relying upon the NNF to provide the only Arctic support facility for the RCN and the Canadian Coast Guard (CCG).

The NNF represents a significant increase in capability for the RCN, but it is not a perfect solution. The cost-saving reductions in project scope removed significant capabilities, and the facility provides little to no value for Northern communities desperate for infrastructure investment. Reliance upon the NNF as the only Arctic facility

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[5] Lee Berthiaume, "COVID-19 blamed as work on military port first promised in 2007 sees new delay," *The Canadian Press*, 2 August 2020.
[6] Adam Lajeunesse, *Finding "Win-Win" China's Arctic Policy and What It Means for Canada,* School of Public Policy, University of Calgary, 2018, 2.
[7] Arctic Council, Protection of the Arctic Marine Environment, "PAME - Arctic Shipping Status Report #3: Shipping in the Northwest Passage: Comparing 2013 to 2019," last modified 13 April 2021. https://pame.is/projects/arctic-marine-shipping/arctic-shipping-status-reports/761-arctic-shipping-report-3-shipping-in-the-northwest-passage-comparing-2013-to-2019/file.

capable of supporting the RCN and CCG represents a significant risk for the Government of Canada. This paper will argue that the NNF should be viewed only as a short-term solution to enable RCN Arctic operations with the longer-term solution being the development of regional port infrastructure. This will be accomplished by first reviewing the RCN requirements before evaluating the long-term potential for the NNF. From there, the paper will discuss the requirements and some potential options for a long-term solution.

RCN ARCTIC REQUIREMENT ANALYSIS

According to the current defence policy, *Strong Secure Engaged* (SSE), the RCN needs to be able to "operate in the Arctic, alongside the Canadian Coast Guard, and alongside allied partners."[8] To achieve this mission, the RCN will be provided with six Arctic and Offshore Patrol Ships (AOPS) to conduct armed, sea-borne surveillance.[9] The AOPS provide the capability to operate further north than the current fleet, enabling the RCN to conduct maritime surface domain awareness operations and support OGDs. Operating in the Arctic ice is a relatively unfamiliar mission for the RCN, as the fleet has not had an ice-capable ship since de-commissioning HMCS *Labrador* in 1957. Since 2007, the annual OP NANOOK exercises have been limited in duration and location by the employability restrictions of non-ice-capable ships and submarines. In addition to having ice-capable ships, projecting a presence further into the North brings support challenges, as ships require fuel, stores, and aviation fuel (if a helicopter air detachment is embarked) to stay on station for longer durations. The Canadian Arctic Archipelago is

[8] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy,* (Ottawa: National Defence), 35.
[9] Ibid. 35.

an extremely large area to cover, with little to no supporting infrastructure, and unlike conventional blue water operations, the ice precludes the ability to leverage tanker support for at-sea resupply. Thus, construction of an Arctic naval facility, currently intended to be the NNF, would enable Arctic operations of the AOPS and CCG vessels.[10]

Despite not having an Arctic refuelling facility, the RCN has successfully sent the *Halifax*, *Kingston* and *Victoria*-class vessels into the Arctic. To facilitate the long transit from their home port in Halifax, the *Halifax*-class vessels, for example, would sail with their emergency fuel load embarked. After stopping to top up their fuel tanks in St. John's, they would make the 1200 nm trip to Iqaluit.[11] From there, it is a further 1080 nm to Nanisivik and the entrance to the Northwest Passage. Once in the Arctic, the only options for fuelling were to transfer fuel from CCG vessels while at anchor or to fuel in Nuuk, Greenland. With the introduction of the AOPS, the capability and expectations for where the RCN will operate have changed. Operating much further North, the ability to rely upon a similar fuelling strategy is not feasible and the need for a refuelling facility becomes critical.

Having established the need for an Arctic fuelling facility for the RCN to carry out its mission, the challenge is to determine a suitable location and necessary facility requirements. The facility location must be compatible with the range and icebreaking capabilities of the AOPS, and the facility must be able to provide necessary support including fuel, provisions and, potentially, JP-5 aviation fuel.[12] In accordance with SSE,

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[10] Ibid. 79.
[11] Sailing distances provided by HMCS *Summerside.*
[12] Unlike the Coast Guard, the only aviation fuel certified to be safely embarked in an RCN ship is JP-5. This is due to the requirement to maintain a flash point above 60 degrees Celsius. Unfortunately this fuel is no produced in Canada due to the low demand, and is brought up from the United States.

the facility must also support CCG icebreakers, however these were designed to operate independently in the Arctic, and as a result have significantly more endurance than the AOPS.[13] This means the facility requirements are driven primarily by the supporting needs and design limitations of the AOPS. Assessing the actual capabilities of the AOPS is challenging as the lead ship, HMCS *Harry DeWolf,* is still in the midst of conducting contractor sea trials. Therefore, to assess the requirements for an Arctic fuelling facility, the AOPS design specifications will be used as a proxy.

Compared to CCG vessels, the AOPS are designed for a relatively limited range of 6800 nautical miles at 14 knots.[14] The full range of the ship is dependent upon several factors, including speed, ice conditions, and electrical load. In reality, the AOPS will not always be cruising at 14 knots, especially in ice conditions or whilst breaking ice. Fitted with an electric propulsion plant, the rate of fuel consumption is proportional to the electrical load. The configuration of diesel generators and the operation of large electrical load items, such as de-icing equipment, further impacts the rate of fuel consumption. In order to conduct maritime surveillance, the AOPS will need extended time on station to develop domain awareness. To accomplish this, particularly while operating in the Northwest Passage, the facility needs to be north of 60°N Latitude, and ideally north of the Arctic Circle. Referring to Figure 1, it is possible to gain a sense of the distances both within the Arctic Archipelago and also to RCN bases in Halifax and Esquimalt.

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[13] Canadian Coast Guard, "Icebreaking fleet of the Canadian Coast Guard," last modified 7 November 2019, https://www.ccg-gcc.gc.ca/icebreaking-deglacage/fleet-flotte-eng.html.
[14] Department of National Defence, "Arctic and Offshore Patrol Ship," last modified 9 January 2020, http://dgpaapp.forces.gc.ca/en/defence-capabilities-blueprint/project-details.asp?id=1728.

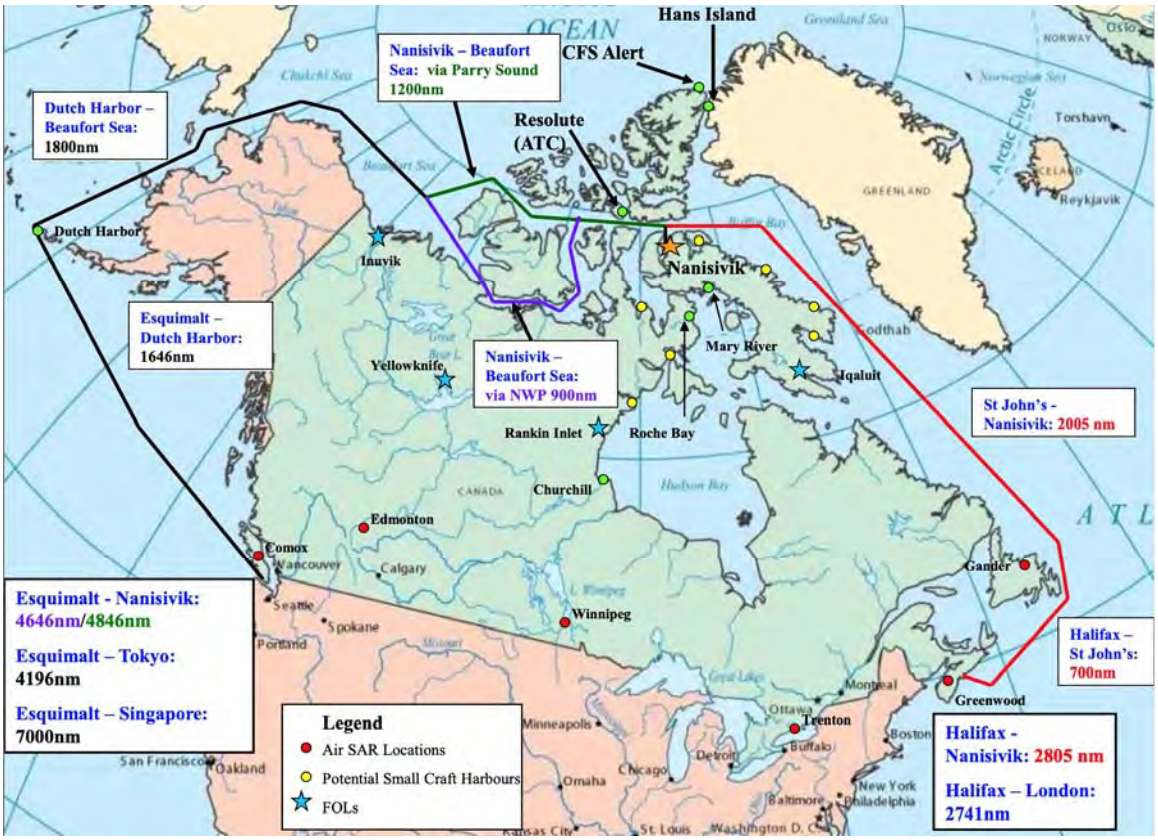

Figure 1 - Sailing distances to and within the Canadian Arctic

Source: Smart, *AOPS & The Arctic: Future Trends and Influences*, 29.

With a Polar Class 5 rating, the AOPS are capable of breaking up to one meter of first year ice, with old ice inclusions.[15] While this is roughly equivalent to the CCG medium icebreakers, it is a far cry from the capabilities of their heavy ice breakers.[16] This won't enable the AOPS to operate near the North Pole, but will enable operation in the lower Arctic and the Northwest Passage, ice conditions permitting. When it comes to finding the ideal location for a naval facility, the further north the port is located, the shorter the available operating season. While moving the fuelling facility farther north greatly expands the range, mitigating for the presence of ice requires the opposite

[15] Naval Technology, "Harry DeWolf-Class Arctic/Offshore Patrol Ships (AOPS)," last accessed 1 May 2021, https://www.naval-technology.com/projects/harry-dewolf-class-arcticoffshore-patrol-ships-aops/.
[16] Canadian Coast Guard, *Icebreaking fleet of the Canadian Coast Guard*.

approach. The farther north the facility, the shorter the summer shipping season. If the facility is placed too far north, its usability decreases and the challenge of resupply increases. Ultimately, climate change seems to be reducing the impact of ice, but how long it will take to remove the consideration is unknown. The AOPS were only designed for a 25-year service life, which makes waiting for climate change to resolve the challenges of ice unrealistic.[17]

To keep a naval vessel operating at sea requires more than just marine diesel fuel. Sustained operations require the ability to receive spare parts and fresh food, and this has proven challenging for HMC Ships in the past.[18] While this can partially be mitigated with careful planning, there is no way to predict the need for corrective maintenance or a technical assistance visit. This is likely why the original NNF plan included a jet-capable runway, but, unfortunately, this requirement was removed when the project was de-scoped to cut costs. There are still regional airports in the Arctic such as Resolute, Pond Inlet, Arctic Bay or Iqaluit that can help mitigate this requirement. As a further requirement, if the AOPS has a helicopter air detachment embarked, it is reasonable to expect that it will need to refuel JP-5. This presents a particular challenge for the RCN, even outside of the Arctic, as JP-5 fuel is not produced in Canada due to limited demand, resulting in the need to import it from the United States. For safety considerations, only JP-5 fuel can be embarked into naval vessels due to the low flashpoints of the fuels commonly used by land-based aircraft. Given that the NNF won't provide JP-5, an AOPS

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[17] Department of National Defence, *Arctic and Offshore Patrol Ship*.
[18] Adam Lajeunesse, *The Canadian Armed Forces in the Arctic: Purpose, Capabilities and Requirements* (Calgary: University of Calgary Press, 2015), 7.

conducting an extended deployment to the Arctic with an embarked air detachment will have to come south to meet up with a tanker for a Replenishment-At-Sea (RAS).

NANISIVIK NAVAL FACILITY EVALUATION

The NNF meets its primary objective of suppling marine diesel to both RCN and CCG vessels during the summer shipping season. As seen in figure 1, the NNF has a central location within the Arctic that is well situated to replenish AOPS operating in the region, thereby mitigating any concerns about their range. Additionally, it is reachable by AOPS operating from either Halifax or Esquimalt, especially if they top up fuel in St. John's or Dutch Harbour respectively.

Despite these advantages, the NNF also has a number of drawbacks, including its location. Located that far north and being fitted with unheated fuel tanks presents a number of operating challenges. Filling the fuel tanks requires delivery by sea, which is subject to ice conditions. Additionally, any fuel stored on site needs to be consumed before the end of the season as the unheated tanks will not be able to store the fuel over the winter, even with the presence of cold weather additives.[19] Any fuel remaining at the end of the operating season will have to be removed by ship for proper disposal. This can be mitigated with careful coordination of fuel procurement to match the demand. The cost of fuel delivery, and if needed, removal and disposal, to support a few ships over a period of a couple of months will be expensive but will amount to a small percentage of the RCN's overall fuel budget. The NNF's lack of JP-5 storage results in little to no

[19]Fuel stored over the winter in unheated fuel tanks will fall below the pour point of the fuel rendering it unusable. For naval distillate fuel with winter additives (Type-15) the pour point is at -18° C. The full list of fuel properties can be found here: Government of Canada, "Naval Distillate Fuel / prepared by the Canadian General Standards Board," last modified 3 April 2013, http://www.publications.gc.ca/site/eng/9.840344/publication.html.

support value to air operations for AOPS with embarked Cyclone detachments. The deletion of the 'jet capable' runway limits the ability to support short notice delivery of parts or the deployment of a mobile repair party.[20] Also the limited storage capacity prevents the prepositioning of stores or the storage of provisions.

Aside from the technical aspects, the one other major drawback of the NNF is its lack of benefit for the regional economy. Northern communities have been fighting for improved infrastructure for years but have not always been successful in lobbying the Federal Government. Some have even turned to seeking foreign investment to facilitate regional growth.[21] The NNF location was chosen as it was an established port in an ideal location that was already owned by the Crown. However, had the NNF been co-located with an established community, it could have provided additional benefit. While the NNF concept may work in the short-term, there is no long-term transition plan should the RCN seek to get out of the Arctic port facility business.

As demonstrated, the NNF is not a perfect solution. Its strategic location and ability to provide fuel meet the basic requirements for supporting the RCN with the other technical shortcomings able to be addressed through future upgrade projects. The lack of benefit for regional communities means the facility cannot be easily transferred to a local community. Given these issues, the NNF should be considered as a short-term solution or as a node in a much larger port infrastructure network.

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[20] People and provisions could still be flown into the nearby Arctic Bay Airport (CYAB), which has a runway within the capability of a CC-130. However moving large amounts of stores the 30 kms to the NNF may difficult.

[21] Sima Sahar Zerehi, "Nunavut hamlet seeks Chinese investors to build dream port," *CBC News,* 30 August 2016, https://www.cbc.ca/news/canada/north/nunavut-port-chinese-investors-qikiqtarjuaq-1.3740470.

A LONG-TERM SOLUTION

There are several challenges in using the military to justify long-term infrastructure development, particularly in the Arctic. In the absence of existing regional infrastructure, the military has been effectively used in the past as a tool for regional development as shown by the construction of the Alaskan Highway or the Frobisher Bay Air Base (now Iqaluit Airport). Unfortunately, not all military sites provide sufficient benefit to enable transition to local communities. This is especially true if there is minimal economic value for the regional population, who would otherwise have a vested interest in maintaining the capability. When assessing the impact of the military on Northern development, Dr Whitney Lackenbauer noted that "when developments do not bring obvious community benefits (like the decision to refurbish the dock at Nanisivik as a berthing and refuelling facility rather than building a port at Iqaluit) resentment now runs deep."[22] The reason this lack of transferability is concerning for purpose-built military facilities, including the NNF, is that they will always be susceptible to changes of government priorities and budget cuts. By contrast, infrastructure solutions that meet local economic requirements as well as support RCN operations have the ability to become a viable long-term infrastructure solution. As a result of all these factors, the path to long-term success is to empower a locally owned and mutually beneficial solution supported initially by reliable federal funding.

If developing port facilities in Northern communities is the path to long-term success, then the question remains which communities should be prioritized and how many ports are needed. This will inevitably be driven by the location and volume of

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[22] P. Whitney Lackenbauer, "The Military as a Nation Builder: The Case of the Canadian North," *Journal of Military and Strategic Studies* 15, no. 2 (2013), 31.

maritime traffic, which will be determined by natural resource exploitation as demonstrated by Milne Inlet.[23] The ideal long-term solution is likely to have a combination of ports that can support the local communities, provide services to both RCN and CCG vessels, and weather fluctuations in natural resource demand. Unfortunately, there are few Arctic or near-Arctic communities that provide viable options for a deep-sea port, with each potential option having benefits and drawbacks. This section will briefly highlight three alternative options to Nanisivik, each of which currently has some critical infrastructure in place. These options are Iqaluit, Churchill and Tuktoyaktuk. It should be understood that there are additional options, such as Qikiqtarjuaq, that have potential but require significant investment.

Opening in 2021, Iqaluit's new deep-sea port will expedite the resupply of commercial goods to the city.[24] At present the port does not offer bunkering services, and this capability would have to be added to meet the needs of the RCN and CCG. Located in the Arctic and near the transition of the Arctic and Atlantic Oceans, Iqaluit could support both the AOPS and the RCN's non-ice-capable classes operating in the region. What Iqaluit lacks in terrestrial transportation links to the South, it makes up for in its proximity to the busy shipping lanes in the Davis and Hudson Straits. Located only 1100 nm from Lancaster Sound, Iqaluit is significantly closer to the Northwest Passage than Churchill. The presence of a large airport and the ability to preposition stores provide additional advantages over the NNF.

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[24] Dustin Patar, "Iqaluit deepsea port project remains on schedule for 2021 completion," *Nunatsiaq News,* 14 October 2020, https://nunatsiaq.com/stories/article/iqaluit-deepsea-port-project-remains-on-schedule-for-2021-completion/.

Located in Hudson Bay at the mouth of the Churchill River, the existing port of Churchill is not technically an Arctic port.[25] However, it is the only port in the region serviced with a railway connection and has four berths capable of handling Panamax-sized ships. Originally designed as a commodities port to export Prairie grain, it is now capable of loading oil and is currently used to supply Northern communities. The ability to resupply fuel storage without the need to rely on shipboard delivery or contend with ice restrictions is a significant advantage. If regular shipments of grain and oil depart from Churchill, then there would be an advantage to stationing a vessel in the Hudson Bay region. The town of Churchill is supported by a large airport and is suitable for prepositioning of stores. To ensure long-term viability, the Port of Churchill is, as of 2021, privately owned by local and Indigenous partners.[26]

Tuktoyaktuk's port facilities are very limited at present, especially when compared to Churchill, Iqaluit and Nanisivik. However, its location on the Barents Sea, which enables monitoring of the western approaches to the Northwest Passage, makes it worthy of consideration. The town has recently been connected via an all-season road, which offers resupply advantages over island-based locations. In addition to the requirement to construct a jetty and refuelling facilities, the port has a very shallow draft and would have to be dredged to accommodate larger ships, including the AOPS.[27]

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[25] The definition for what area constitutes the Arctic is not universally agreed upon. While some default to north of the Arctic Circle, others, including the Arctic Council, vary their definition depending on the application. For the Arctic shipping reports, the region covered by the Polar Code is used. In both definitions the Port of Churchill falls just outside the Arctic region, whereas using the Polar Code region keeps Iqaluit inside the Arctic.

[26] Real Agriculture, "Port of Churchill moves under 100% local and Indigenous ownership," last modified 11 March 2021, https://www.realagriculture.com/2021/03/port-of-churchill-moves-under-100-local-and-indigenous-ownership/.

[27] David Thurton, "Deep water port in Tuktoyaktuk could bring business to N.W.T.," *CBC News*, 2 December 2014, https://www.cbc.ca/news/canada/north/deep-water-port-in-tuktoyaktuk-could-bring-business-to-n-w-t-1.2857238.

Fortunately, Tuktoyaktuk has a very small tidal range to contend with as compared to Iqaluit.[28] There is an airport near the port, but it is very limited in capacity, as is the airport in Inuvik (a two and half hour drive away). Tuktoyaktuk would require the most significant investment of the three options proposed, but its western location on the NWP is worthy of consideration.

CONCLUSION

Climate change will continue to increase interest in the Arctic, which will necessitate the presence of the RCN in the region. To achieve the mission laid out in SSE the RCN requires the ability to support its vessels within the Arctic. Despite some reduction in capability during the procurement phase, the NNF meets the most critical aspect of this requirement, the refuelling of ships. As a remote military installation, the NNF will always be susceptible to changes in government priority, policy and budgetary requirements. The fact that it provides limited or no value in meeting the local community's infrastructure needs means there is little likelihood that it can be successfully repurposed by the Nunavut government. Despite this, the NNF could still serve as a viable short-term option to enable the RCN to regain its corporate knowledge of Arctic operations. However, its long-term potential appears limited once regional port infrastructure development catches up.

As evidenced by past examples of successful and sustained Northern infrastructure projects, the path to long-term success involves providing benefit that will empower the economic growth of local communities. The government should look to invest in developing the port infrastructure in Northern communities that can be

[28] University of Guelph, "Tidal Amplitudes," last accessed 5 May 2021, http://www.arctic.uoguelph.ca/cpe/environments/marine_water/features/Tides/amplitude.htm.

leveraged by the RCN and CCG. This paper suggested three such options worthy of further examination: the addition of a ship refuelling capability in the new port in Iqaluit; leveraging the existing port in Churchill; and funding the construction of a port in Tuktoyaktuk. Given the time required to construct Northern infrastructure projects, it is recommended that the Federal Government in conjunction with provincial and territorial governments and Indigenous communities seek a solution that meets everyone's needs.

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