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LAND FOR HOMES  
IGLUQPIURVIKHAT

# ARCTIC BAY NU

## COMMUNITY SUMMARY

**DRAFT**



DRAFT January 2025



# ARCTIC BAY NU

## Community Summary



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# ARCTIC BAY NU

## Community Summary



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### COMMUNITY EXECUTIVE SUMMARY



**Figure 1: COMMUNITY MAP**

Arctic Bay, known as Ikpiarjuk in Inuktitut, is the third most northerly community in Canada. As of the 2021 Census, the population is 995.

The community is surrounded by high hills and is vulnerable in places to rockslides and drainage from the mountains.

Geotechnical studies indicate ground instability and slope instabilities, with poorly drained soils and seasonal drainage issues. The topography presents challenges with slopes ranging from flat to steep, requiring significant site work for construction. Permafrost sensitivity to climate change is moderate to high, with ice wedges and frost creep affecting the area.

Climate change is expected to increase mean annual temperatures, exacerbating permafrost degradation and infrastructure risks.

Infrastructure challenges include uncertain timing for new subdivisions, road degradation, and inadequate drainage. There is a shortage of truck drivers for water and wastewater operations, affecting service capacity. The community relies on contractors to produce granular materials, with well-graded sandy gravel and fragmented shale bedrock being the main sources.

Municipal development priorities focus on redeveloping within the hamlet core before expanding to new lots.



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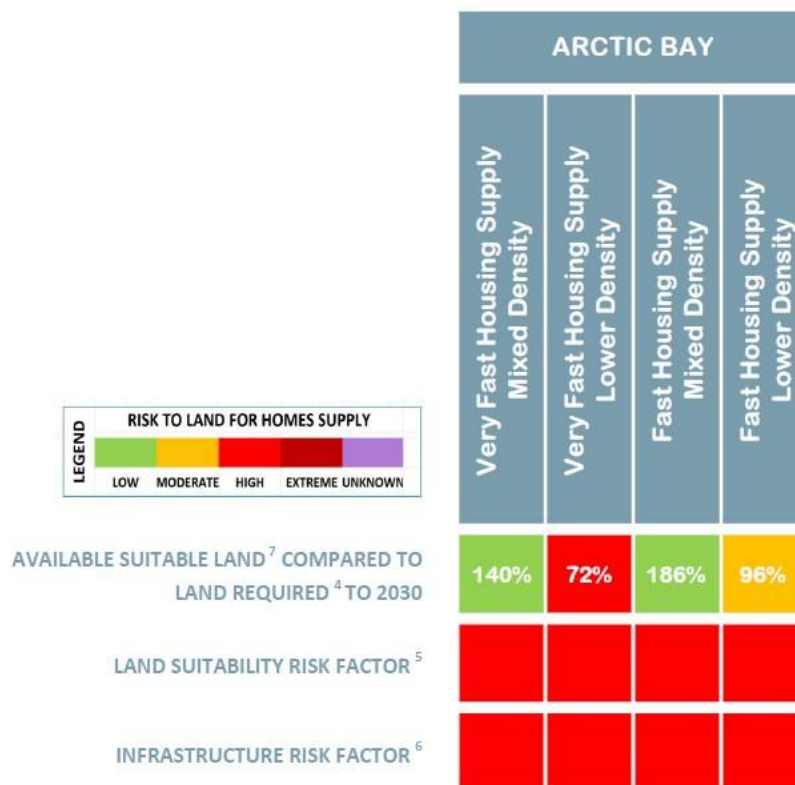
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Neighbourhood A (South Subdivision) faces geotechnical challenges with evidence of landslides and poorly drained soils. Most roads and power infrastructure are not yet constructed.

Neighbourhood B (Block 3 Plan 4090) is planned for development, with some lots intended for a daycare. This area also faces geotechnical and drainage challenges, with significant fill required for some lots.

**In summary, though Arctic Bay has a substantial inventory of surveyed land, this is impacted by significant suitability challenges and a need for infrastructure such as roads, drainage and power. Without action, a lack of suitable land is a potential risk to new housing within the next five years. Risks can be mitigated by responsive design, infrastructure investment, utilizing redevelopment sites, and efficient use of land.**

## COMMUNITY LAND GAP ASSESSMENT



**Figure 2: LAND SUPPLY RISK TO 2030 (existing infrastructure only)**



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### Overview

*For more information, see L4H Nunavut Land Gap Assessment charts and L4H Guides.*

The Community Land Gap Assessment chart estimates the risk for a shortage of suitable land prior to 2030. L4H extracted the GN's land inventory (legally surveyed, vacant, and greater than 500m<sup>2</sup> in area), and adjusted for lots known to be already reserved or leased. Infrastructure Risk and a Land Suitability Risk factors were applied to arrive at an estimate of suitable, build-ready land, which was compared to estimated land needs.

### Housing Supply and Density Scenarios

Risk assessment scenarios allow for variables in the rate of new home supply ("Very Fast" assumes Nunavut 3000 targets; "Fast" assumes 75% Nunavut 3000 targets) and the amount of land required for each new home ("Mixed Density" assumes public housing at 275m<sup>2</sup> per unit and other housing at 675m<sup>2</sup> per unit; "Lower Density" assumes all housing averaging 675m<sup>2</sup> per unit).

### Land Suitability Risk Factor

An overall Land Suitability Risk Factor was applied based upon social-cultural, legal, technical, environmental, and constructability characteristics. A High-risk assessment was assumed to reduce available lots by 40%; a Moderate risk assessment was assumed to reduce available lots by 20%.

### Infrastructure Risk Factor

An overall Infrastructure Risk Factor was applied based upon the general status, condition, and capacity of the roads and drainage, power and water/wastewater services to development areas and lots. A High-risk assessment was assumed to reduce available lots by 40%; a Moderate risk assessment was assumed to reduce available lots by 20%. Timely infrastructure improvements can be expected to reduce the overall risk of land shortages.

## COMMUNITY - PLANNING AND LANDS

### Community Name

Arctic Bay

### Community Identifier Number

200



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### Demographic Characteristics

Current Population: 995 (2021 Census)

## COMMUNITY - GENERAL

### Community geographic and historical context

([www.gov.nu.ca](http://www.gov.nu.ca)): Arctic Bay is the third most northerly community in Canada. It is called Ikpiarjuk - "the pocket" – in Inuktitut because of the high hills that surround the almost landlocked bay from which the community gets its name. A Hudson's Bay Co. post was established in 1926 but closed the following year.

The post was re-established in 1936, when Inuit originally from Pangnirtung and Cape Dorset were relocated here from the unsuccessful Hudson's Bay post at Dundas Harbour.

In the 1950s, the federal government sought to bring modern services to Inuit in the area. By the end of the 1960s, the settlement included a school, hostel, twenty-two houses, and a small set of government offices.

### Community Input - Development Priorities or Concerns

2024 L4H Tour: SAO Noted that the priority was to redevelop within the hamlet core first before developing new lots.

2023 NHC Tour: Some residential lots are being set aside for community use. Timing of infrastructure for south subdivision is uncertain.

### Notable Land Form Characteristics

- Tundra
- Ocean (tides 1.2 to 3m)
- Mountains

2024 L4H Tour: Hamlet is built along base of mountains that surround the bay. Vulnerable to rockslides and drainage from mountains.

Risk to planning, design or construction: Medium

### Notable Flora/Fauna Characteristics

- Sea mammals.
- Whales

Risk to planning, design or construction: Low



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### Notable Views and Vistas

- Ocean
- Mountains

Risk to planning, design or construction: Low

## COMMUNITY - TECHNICAL

### Geotechnical Characteristics

2024 L4H Tour: There appears to be areas of ground instability and sources of rockslides in the escarpment slopes above the hamlet core and new subdivisions. Trip technical participants noted several locations within the existing hamlet core that were quite steep and advised that they should not be disturbed.

2023 Stantec Technical Study: Evidence of slope instabilities are present within the study area, both within the developed portion of the community and along the slopes backing the general bay area. Portions are poorly drained or subject to seepage and waterlogged soils.

Risk to planning, design or construction: High

### Surface Drainage Characteristics

2024 NHC Tour: Some of the lots have poor drainage.

2023 Stantec Technical Study: portions are poorly drained or subject to seepage and waterlogged soils. Spring snowmelt runoff and summer-fall drainage issues are a persistent seasonal hazard for the community. Portions are poorly drained or subject to seepage and waterlogged soils.

Risk to planning, design or construction: High

### Topography

2023 NHC Tour: Slopes on many lots present design and construction challenges especially for larger multiplexes. Challenging community topography can require more sitework, cut, and fill.

2023 Stantec Technical Study: Most of Arctic Bay was developed on south and east facing slopes ranging from relatively flat (0-5%) to approximately 15%. Short steep slopes, some in excess of 25%, are found locally throughout the community (e.g., alongside building pads, road embankments or road cuts, along the shoreline). Slopes within development areas can exceed 10%.



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Risk to planning, design or construction: High

### Permafrost Characteristics

2023 Stantec Technical Study: Overall sensitivity of Arctic Bay permafrost to climate change is moderate to high. Networks of ice wedges were identified along the slope marking the perimeter of the developed portion of the community. There appears to be widespread occurrence of frost creep within hamlet, both along undisturbed slope segments and areas where development took place. It is reasonable to expect that changing climatic patterns will intensify permafrost degradation, leading to ground instabilities, local flooding and washouts along roads and access trails.

Risk to planning, design or construction: High

### Climate Characteristics

2024 L4H tour: Some of the shoreline appears to be vulnerable to coastal erosion and this risk could increase due to expected impact of climate change.

2023 Stantec Technical Study: Mean annual temperatures are projected to increase by up to 4.6 degrees C by 2070 – a period that is within the projected lifespan of housing being built today. This will increase the risk of permafrost, soils and slope instability likely putting some infrastructure and buildings at risk.

Risk to planning, design or construction: High

## COMMUNITY - INFRASTRUCTURE

### Roads

2023 NHC Tour: Timing of infrastructure for south subdivision is uncertain.

2023 Stantec Technical Study: Some degradation of recently constructed roads and pads in new development areas. Ditches and channel are often absent from roadsides, with only the shallow swale marking the edges of the road embankment conveying water. Field observations have shown that most existing roads are built on low embankments, often resulting in the lack of proper ditches on the uphill sides of roads. Sections of roads and ditches were also observed to lack grading, sometime resulting in ponding of surface water.

Risk to planning, design or construction: High



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### Drainage

2024 L4H Tour: There are many drainageways from the escarpments above the hamlet that drain through the hamlet core and the new subdivisions. Drainage improvements will be needed to allow development in the new subdivisions.

2023 Stantec Technical Study: Roads lacking adequate ditches and drainage channel; with sections lacking grading resulting in ponding of surface water.

Risk to planning, design or construction: High

### General Comment - Wastewater Infrastructure

2024 L4H Tour: SAO noted capacity was indeterminate since unable to predict population trend adequately

There is a shortage of truck drivers for water and wastewater operations, which could affect ability to service new homes

Risk to planning, design or construction: Low

### General Comment - Water Infrastructure

2024 L4H Tour: Shortage of truck drivers. SAO noted capacity was indeterminate since unable to predict population trend adequately

2024 L4H Tour: There is a shortage of truck drivers for water and wastewater operations, which could affect ability to service new homes.

Risk to planning, design or construction: Low

### General Comment - Aggregate or Granular Supply

2024 - NCCD contacted 2 contractors who produce/haul but could not obtain information cost per m3 of any sort of material. NCCD was unable to obtain supply details and provided no additional commentary for 2024

2023 L4H: Hamlet mostly dependent on contractors for operations and provided no information on sources.

2023 Stantec Technical Study: Well-graded sandy gravel deposits are the main source of granular aggregate materials for the community. Fragmented shale bedrock is commonly used as construction material (both for road embankment and building pads).and is vulnerable to progressive weathering leading to significant settlement, especially in the first few years following construction

Risk to planning, design or construction: Medium



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### NEIGHBOURHOOD 'A'- PLANNING AND LANDS

Plan Number: 4000

Block Number: 2

**General Description:** South Subdivision (Mitaviviningmiut)



**Figure 2: NEIGHBOURHOOD 'A' MAP**

### NEIGHBOURHOOD 'A' - GENERAL

#### Local Input Development Priorities or Concerns - Neighbourhood

L4H 2024 Tour notes: Community advises not planned to be built.

NHC 2023 notes: 2024 - NCCD contacted 2 contractors who produce/ haul but could not obtain information cost per m3 of any sort of material. NCCD was unable to obtain supply details, and provided no additional commentary for 2024

2023 L4H -Hamlet mostly dependent on contractors for operations and provided no information on sources.

2023 Stantec Technical Study: Well-graded sandy gravel deposits are the main source of granular aggregate materials for the community. Fragmented shale bedrock is commonly used as construction material (both for road embankment and building pads).and is vulnerable to progressive weathering leading to significant settlement, especially in the first few years following construction



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### NEIGHBOURHOOD 'A' - TECHNICAL

#### Geotechnical Characteristics - Neighbourhood

2023 Stantec Technical Study: Evidence of landslides are present along various slope segments surrounding the community, including upslope from Blocks 2. Some are recent with potential impacts on infrastructure.

#### Surface Drainage Characteristics - Neighbourhood

2023 Stantec Technical Study: Two major gulleys run on either side of Block 2. Peak drainage discharge and shallow landslides initiating in or entering these gulleys may pose a hazard to local infrastructures (including roads, buildings and drainage structures). The soils in the southern portion of Block 2 appear to be poorly drained.

#### Topography Characteristics - Neighbourhood

2023 Stantec Technical Study: Along the uppermost row of lots projected for Block 2, the terrain has an average slope of 15%, then progressively increasing as the terrain climb towards the steep bedrock escarpment surrounding the community. East (downslope) of Road R69, the natural grade was estimated at 10%, until reaching a much steeper cut slope (30 to 45%)

#### Permafrost Characteristics - Neighbourhood

2023 Stantec Technical Study: Ice wedges are predominant on undeveloped sectors of Blocks 2, 3 and 5.

### NEIGHBOURHOOD 'A' - INFRASTRUCTURE

#### Road Infrastructure - Neighbourhood

2024 L4H Tour: Most of the roads have not been constructed and are not planned to be built

#### Drainage Infrastructure - Neighbourhood

2024 L4H Tour: Drainage improvements will be needed to allow development in the subdivision.

#### Power Distribution Infrastructure - Neighbourhood

2024 L4H Tour: Power has not been extended to most of the subdivision.



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### NEIGHBOURHOOD 'B' - PLANNING AND LANDS

Plan Number: 4090

Block Number: 3

**General Description:** Block 3 Plan 4090 (Qamanaugag)

**Figure 3: Neighbourhood B Map**





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### NEIGHBOURHOOD 'B' - GENERAL

#### Local Input Development Priorities or Concerns - Neighbourhood

2024 NHC Tour: Hamlet is planning to develop this neighbourhood. Lots 38-40 intended for daycare.

### NEIGHBOURHOOD 'B' - TECHNICAL

#### Geotechnical Characteristics - Neighbourhood

2024 NHC Tour: Lots 13-15 appear to be soggy and rolling rocks.

2023 Stantec Technical Study: The uppermost portion of Block 3 was found to be located within 150 m of slopes segments presenting rockfall hazards. Evidence of landslides present along various slope segments surrounding the community, including upslope from Blocks 2, 3, and some are recent with potential impacts on existing infrastructure.

#### Surface Drainage Characteristics - Neighbourhood

2024 NHC Tour: Lots 19-23 have a possibility of road washout.

#### Topography Characteristics - Neighbourhood

2024 NHC Tour: The lots 25-48 on the lower side require significant fill.

#### Permafrost Characteristics - Neighbourhood

2023 Stantec Technical Study: Ice wedges are predominant on undeveloped sectors of Blocks 2, 3 and 5.

### NEIGHBOURHOOD 'B' - INFRASTRUCTURE

#### Road infrastructure - Neighbourhood

2024 NHC Tour: Hamlet noted intention to develop Phase 2 internal road as per community plan in future, time to be confirmed.

#### Drainage infrastructure - Neighbourhood

2024 L4H Tour: Drainage improvements will be needed to allow development in the subdivision.



# ARCTIC BAY NU Community Summary



## PHOTOGRAPHS

*(from 2023 NHC and L4H community Tour)*





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