

Original article

The making and re-making of high modernist towns in the Circumpolar North



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ABSTRACT

In this article we explore the fate of high modernist architecture and settlement planning in the North, through the lens of mining towns in Sweden and Quebec. After WW2, cities across the world were subject to a wave of restructuring in accordance with high modernist ideals. The circumpolar north became the subject of some of the most radical examples, often described as utopian. In the Swedish Arctic, a renowned architect Ralph Erskine played a leading role. He combined functionalist principles, with ideas of creating settlements protecting inhabitants from harsh Arctic conditions, in harmony with the environment. Erskine's ideas were implemented to a different extent in Kiruna and Svappavaara in north Sweden in the 1960's and in Fermont, Quebec, in the early 1970's. Our aim is to understand the challenges of creating industrial settlements in the Arctic, with the capacity to attract employees that are needed for resource extraction and other industries. While Erskine's architecture in Svappavaara and Kiruna will be demolished, the wall shaped town in Fermont is still intact and expanding. By comparing and highlighting differences, we call attention to the threat of demolition of legacies of an era that has yet to be defined as cultural heritage.

1. Introduction

The aim of this article is to understand the challenges of creating industrial settlements in the Arctic, with the capacity to attract large numbers of employees from outside of the region that are needed for work within resource extraction or other large-scale activities. The challenge of creating attractive settlements for extractive industries is an increasingly hot topic in several regions of the Arctic, particularly in mineral rich areas in the Fennoscandinavian north and in northern Quebec. This is driven partly by a rapidly growing interest and need for a transformation from an energy regime based on fossil fuels to one based on renewable energy, as well as an increasing demand for products enabling green transition and electrification. The green transition creates new needs for minerals for renewable energy technologies, which requires new mines and facilities for making batteries or zero emission production of steel. The trend is global, but in Europe and North America the growth of green transition industries has increased the demands for northern resources. In Sweden, the clearest expression of this trend are new mining projects and production facilities for green steel, iron sponge and batteries in the counties of Norrbotten and Västerbotten. In

northern Quebec, the trend is manifested in Eeyou Istchee and Nunavik with numerous projects for the extraction of rare earths, graphite and lithium.

Extractive industries in the north generates economic growth and employment opportunities, but may also result in land use conflicts and opposing perspectives on the future. So far however, for the companies and municipalities, a major challenge is to attract a labor force. In Arctic Sweden, companies and municipalities envision a need for at least 100,000 new residents in the coming years, to supply direct employment in these industries, but also in the construction and service sectors of the economy. The process of attracting qualified labor force into the region is directly connected to the success of the green transition. In the light of these recent developments, the possibility of creating living environment in the Arctic cities supporting and sustaining these ambitious goals is becoming crucial.

This is not the first time in history that Arctic regions have been subject to booming interest in natural resources and industrial production. Nor is it the first time that corporate and state actors have attempted to build towns and settlements meant to attract employees and stimulate them to stay. Northern Sweden and Quebec offer several

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examples of this societal dimension in the development of large socio-technical systems for extractive industries. These examples provide a useful repository of historical case studies, from which important insights can be drawn in relation to the current challenges in northern industrial settlement planning. In this paper, we explore three cases of mining towns that were designed to attract employees during the post-second World War period of mining industry expansion in the north: Kiruna and Svappavaara in Norrbotten, Sweden and Fermont in Quebec, Canada. How can the creation of sustainable and attractive settlements in the Arctic be facilitated, settlements with the capacity to meet intensified needs for socio-economic development in the north? What lessons can be learned from previous experience of creation of model cities for the Arctic?

We use the mining towns Fermont, Kiruna and Svappavaara as case studies due to their similarities but also differences that are vital for understanding and explaining success and failure in Arctic settlement planning. One of the common features relates to the primary goal of these settlements: to cater for the increased demand for labor in the mineral extraction. A second common feature is that they were either directly designed or inspired by the ideas of architect Ralph Erskine. His vision was to combine the strictly rational functionalist principles of industrial production, with an idea of a settlement protecting its inhabitants from the harsh environment of the circumpolar north, while co-existing in harmony with the surrounding nature. His solution was a wall-shaped mining town with most housing and service functions placed within one single building, relieving its population from having to go outside and protecting outlying housing units from harsh climate. The differences are found in the geographical and historical contexts these towns were built in Quebec and Sweden, as well as the extent in which Erskine's ideas were implemented. While Fermont has become a highly valued, even iconic monument of the modernist ideals of the 1950s and 60s, well-preserved and in active use, Erskine's modernist plan and architectural design in the Swedish Arctic has not met the same fate.

This study is based on observations, documentation, and interviews, conducted during fieldwork by the authors at Kiruna, Svappavaara and Fermont in the period 2019-2021, as well as written sources from the archives of municipal and regional authorities. We are inspired by methodological and theoretical approaches in industrial heritage research (Nisser, 1994; Avango, 2013; Hacquebord et al., 2016) and studies of historical neighborhoods (Chang 2010; Jenkins 2002). Moreover, our understanding of these places is informed by contemporary archeology, ethnography and perspectives emphasizing the mutual interdependence between people and things (Hodder, 2012), including political-semiotic analysis. Using these tools, the paper is also an attempt to access both symbolic and operational characteristics of modernist Arctic architecture and spatial planning. The comparisons in this paper contribute to our understanding of meanings given to the modernistic utopian visions of urban space by Ralph Erskine in Canada and Sweden. They also shed light onto the current state of development of these urban spaces and how mining settlements are designed to support the needs of contemporary society.

2. Modernism in the Circumpolar North

The circumpolar north has always necessitated innovative ways of designing settlements and buildings. Local inhabitants developed different ways of building for a good life in often challenging climatic and environmental conditions. Actors coming from outside of the region, for resource extraction or science, had other skills and perceptions, and therefore other ways of dealing with the challenges of the north. Urban planning and architecture, often with a utopian or ideal town ambition, were often important components of their strategies. There are several examples, already from early modern industrial towns in the Swedish far north, but also from early-twentieth century mining settlements on Spitsbergen (Svalbard) and northern Europe and North

America (Avango 2020). Other regions where modernist designs and urban transformation programs played a role, but not primarily based on the development of extractive industries, were Nuuk in Greenland, Frobisher Bay/Iqaluit in Canada or Murmansk, Russia.

A period of rapid urban development in the history of the Arctic is the post-Second World War period, when high-modernist ideals influenced architecture and urban planning in the Arctic (Andreasen et al., 2010; Kalemeneva, 2018). Globally, cities across the world experienced a wave of economic restructuring and urban development, being designed or redesigned in accordance with high-modernist ideals. Often, the ideas of rationality, inspired by large-scale industrial production systems, underlay these designs. The Arctic also became a subject of some radical examples utilizing modernist ideals in planning and architecture, often described as utopian. According to Hemmersam (2021), this period in the history of the region can be defined as an Arctic urban development boom aiming at transforming and modernizing the previously underdeveloped urban spaces.

Ralph Erskine, who designed or inspired the mining towns at focus in this paper, was also inspired by high modernism in his architectural design and city planning. At the same time, he also belonged to a growing group of architects that wanted to move away from universal architectural and planning designs common in modernist architecture. Inspired by architect Gordon Cullen, Erskine was interested in designing houses and urban spaces in a way that would be in harmony with the surrounding environment. In this sense, Erskine was part of a larger movement from the late 1940s in Sweden and Britain called the New Empiricism, which put human needs into focus (Hemmersam, 2021).

Erskine began to develop his designs for Arctic cities from the late 1950s. He named it a 'Subarctic habitat,' meant to describe a generic built environment that would protect its inhabitants from the harsh conditions of the Arctic. His solution was based on a wall-shaped structure that would protect inhabitants from strong winds and create microclimates better suited for human habitation, while at the same time maximizing access to sunlight. The wall had multiple functions, containing not only housing, but a variety of social services, and designed in a way that would be in harmony with shapes and contours of the surrounding landscape. Erskine's design also aimed at creating density, which enabled sheltering but also worked in favor of social interaction (Hemmersam, 2021, p. 166-169).

Through the years, Erskine was involved in designing a variety of buildings and urban environments in other contexts than the circumpolar north and became a widely recognized architect in the history of modern architecture. It was, however, his work within the field of Arctic architecture and urban planning that earned him particular fame and influence, not least through the three Arctic towns we analyze in this article in this paper, all built with the aim of creating attractive settlement for the needs of extractive industries. In the following two sections, we will analyze how these three towns have changed from the time they were built up to the present, in order to identify processes hindering or stimulating development of attractive settlements in the Arctic.

3. Legacies of modernist utopias in the Swedish North

3.1. The making of modernist Kiruna and Svappavaara

The settlements of Kiruna and Svappavaara are part of the Kiruna municipality, located north of the Arctic Circle in Norrbotten, the northernmost province of Sweden. Both settlements were originally built for the purpose of mining activities. Kiruna was established in 1900, on lands of local Sámi and Tornedalian people, to facilitate the extraction of extraordinarily rich iron ore bodies in the mountains of Kirunavaara and Luossavaara.

Kiruna became a hub in the development of a wider "sociotechnical mega-system," connecting centers for mineral extraction, energy provision, military defense, seaports, railway connection and more (Hansson, 1994, 2015; Avango et al., 2019). The development of this system

allowed the transformation of northernmost Sweden into a region for large-scale resource extraction. The mining company – Luossavaara Kirunavaara Aktiebolag (LKAB) – wanted it to become an attractive settlement, that would make it easier to attract employees from southern Sweden and promote social peace at a time when the labor movement was growing. Two leading architects and settlement planners, Gustaf Wickman and Per Olof Hallman were employed for the purpose. They designed the town in a way that would lessen the impacts of the Arctic climate by making winding streets that would harness the winds and by creating smaller meeting spaces and green areas instead of one main city square (Brunnström, 1980, 1981; Persson, 2015; Sjöholm, 2016). By the end of the 1940s, Wickman's and Hallman's ideas had been fully implemented and Kiruna became increasingly described as a 'model town'. The planners of subsequent expansions and redevelopment plans continued to utilize the 'model town' concept, aiming to maintain this identity and develop it.

The first redevelopment plans for Kiruna emerged in the context of the post-Second World War economic boom, which led to rising demand and prices for iron ore internationally. By this time LKAB had established a prominent position as a producer of iron ore on the European market and wanted to defend and strengthen this position by increasing production. To do so, the company needed to expand its workforce and housing capacity in Kiruna. The idea was not only a simple expansion of housing but attracting new residents to stay. In 1953, the task of designing a new urban plan for the town was given to the Eggers planning bureau, which presented its ideas in 1956 (Nilsson, 1968).

Eggers' plan for the new Kiruna was inspired by the modernist ideals for urban planning and architecture at the time, which from the 1950's became increasingly radical. Small towns as well as large cities in Sweden became subject to extensive urban redevelopment projects, often involving the destruction of older built environments. In this spirit, Eggers bureau defined parts of the historic built environment in Kiruna as "outdated" and in need of reorganisation (Eggers stadsplanebyrå, 1956). In practice, this meant a demolition of old buildings in the Kiruna town center, which would make space available to build attractive new housing for the workers needed. However, Kiruna's population grew faster than any of the planners were able to anticipate, thus the previous plans were revised in 1966 and seemed to be even more radical when it comes to the demolition of old buildings in Kiruna town center (Nilsson, 1968).

As part of this re-making of Kiruna, the municipality invited the architect Ralph Erskine to design new apartment buildings in an area where all previous buildings had been removed. The new housing block was named Ortdrivaren (in English, "the mine tunnel-maker") and soon came to symbolize the new modern Kiruna. The buildings designed by Erskine were built in 1961-1962, with rental apartments, ground floor parking spaces, and a church. The area consisted of two high-rise buildings, 10 and 13 stories high and were later nick-named Snusdosa ("the snuff-box") and Spottkuppen ("the spittoon"); one longer, six-story building in an inner asphalt paved yard nick-named Berlinmuren ("the Berlin Wall"); and two longer, three-story buildings nick-named Mullbänken ("the mull bench"). The architectural design of the buildings has been celebrated as masterpieces in late modernist architecture. The core of Erskine's idea was to adapt the houses to the climate using soft lines and careful placing of the buildings, to make them withstand snow and storms. Among their unique features are balconies resembling elevators in the LKAB mines and the angle of roofs on the two high-rises, which are meant to resemble the angle of the iron ore-body in Kirunavaara and Luossavaara mountains. However, this was the only part of town that Erskine was able to design, thus did not fully embody his idea of the Arctic town.

Parallel to the activities in Kiruna, Erskine also designed buildings for the smaller settlement of Svappavaara, located some 45 km south-east of Kiruna but within the municipality border. Svappavaara was established as a copper mining settlement in the seventeenth century and later iron ore mining arrived (Kummu, 1997, p.79-84). LKAB

included it in its plan for expanding production in the beginning of the 1960s. In 1964, when the state railway authority connected Svappavaara to main railway system, LKAB was able to build ore loading facilities there. Similarly to Kiruna, municipal authorities and the mining company wanted the new settlement to be able to support the industrial expansion with adequate housing and services facilities for the workers (Jansson Myhr, 2015, p.153, p. 175). In 1961, the municipality launched an architectural competition for the new Svappavaara and Ralph Erskine was awarded the design contract in 1962.

In his plan, Erskine followed his ideals on how to design towns for the Arctic (Fig. 1). The plan, which he named "Ansikte mot söder" ("face towards the south") was based on two massive wall-shaped buildings, placed in the north and east of the settlement, meant to act as shields protecting against the dominating wind direction. The wall was to contain apartments for workers and their families, and services such shops, service facilities, childcare, sport and other recreational activities. By placing what amounted to an entire town into one building, Erskine wanted to make it possible for inhabitants to avoid going outside during cold weather and snowstorms. The wall was also meant to function as a further protection to the other buildings. South-west of the wall, according to plan, featured several rows of terraced houses for single families. Further from the wall followed groups of freestanding single-family houses with small garden plots.

The construction of the new Svappavaara commenced in 1964. While building it however, the municipality decided to alter Erskine's original ideas. At the beginning, the wall shaped building was to be constructed together with some 50 single-family houses. Thereafter, the municipality decided to discontinue the project. The part of the wall containing social services and leisure activities was never built, nor were several planned clusters of single-family houses. As a result, the new Svappavaara contained only a fraction of Erskine's Arctic town plan. The 200-meter long wall-shaped building, or Ormen länge ("the long snake") as it was named, contained 88 apartments, with large windows and balconies facing the south and smaller windows on the north-eastern facades. On the leeward side of Ormen Lång there were 52 single family houses. None of the societal services were built (Norrbotten's museum, 2000-11-07).

The main explanation why Erskine's visionary plan was not implemented is that LKAB decided to employ less workers for their new mine in Svappavaara than they originally intended. Another contributing factor was the relatively close distance to Kiruna and the growing use of automobile transportation, which enabled LKAB employees to commute between the settlements. Without a need for population growth in Svappavaara itself, neither the company nor the municipality found it justifiable to build all the suggested housing and social services. Erskine was very disappointed with the end result, stating those who order new settlement plans should believe in the plans they order (Norrbottens museum, 2000-11-07).

3.2. The re-making of Kiruna and Svappavaara

By 2023, much of Erskine's architecture in the settlements of Kiruna and Svappavaara have either been demolished or will be demolished. In Kiruna, the Erksine-designed buildings in Ortdrivaren will be dismantled as a part of a process to relocate parts of the city. Ironically, the relocation is again a result of a rising global demand for mineral resources. In 2004, LKAB decided to open yet another level for mining in the ore body in Kirunavaara. Since this ore body extends below the city itself, LKAB's decision also meant that part of the town had to be relocated, because mining on the new and deeper level would lead to deformation of the surface on which the town is located.

In 2006, Kiruna municipality authority adopted a first plan detailing the transformation of the town based on the expansion of the mining but revised it in 2011 and 2014. The process began with the relocation of transport infrastructure: a new route for the railway was ready in 2012 and the main highway relocated in 2020. The demolition and moving of



Fig. 1. Ralph Erskine's plan for Svappavaara from 1962. Source: Drawings archive, Kiruna Municipality archives, Norrbotten, Sweden.

buildings began in 2015 (Sjöholm, 2016). The municipality's plan for the transformation of Kiruna included consideration of how to deal with the built environments that needed to be either demolished or moved. Sjöholm (2016) has identified a change from the municipality's plan in 2006, which stated an ambition to move as many buildings as possible to the new town location, to the 2014 plan, which was vaguer. As a result, most buildings in the town center of Kiruna – including those that were designated and legally protected as cultural heritage – have been and will be demolished rather than re-located (Sjöholm, 2016, p.54).

Erskine's buildings at Ortdrivadalen in Kiruna were designated as cultural heritage in 1984 by the municipality and were never considered as dispensable before the current mining boom (Kiruna Kommun, 2014). According to the Swedish National Heritage Board, the apartment block designed by Erskine serves as a significant representation of a post-war architecture (Riksantikvarieämbetet, 2021, p.14). In 2002, the county museum of Norrbotten also described the Erskine designed buildings as cultural heritage among other examples of modernist architecture in the county.

In 2014, Kiruna municipality published a report assessing cultural heritage values of the city's built environment. The report emphasized the national interest designation and the recurrent high evaluations of the buildings in the 1984 heritage preservation plan, as well as strong public opinion highly valuing these buildings. To the municipality, the heritage value was that the buildings represented the urban redevelopment of Kiruna in the 1960s and 70s, the faith in the future during this era, and Erskine's climate-adapted architecture. In addition, the buildings were valued as a source of knowledge, for architectural value and by being representative of the work of one of the famous architects of the post-war period.

However, despite these positive evaluations of Erskine's buildings, Kiruna municipality expressed little hope of being able to preserve them. The most obvious reason is the threat caused by proximity to the

deformation zone created by expanding mining operations. Another factor is their building materials and size, making the apartment block costly to move. The report recommended preservation in the form of thorough documentation. The report did mention that if technically feasible, a move of the buildings should be done in sections and re-erected as a unified group.

Public and private stakeholders' attitudes towards the heritage value of Erskine's buildings were somewhat divided as well. Interviews with stakeholders from the period 2011-2016 revealed a following viewpoint: "Kiruna's center is a broken environment, both functionally and visually" (author interview). The modernist period of the city's development between 1950s-1980s was blamed for altering the previous historical character of the town. Furthermore, modern buildings created during this period never gained the same value in comparison to other built environments thus not worth saving (interview with former city architect, 2011). Others mentioned the fact stating that a modernistic built environment has become not only outdated, but also too expensive to both maintain and relocate.

In the view of the current municipal planners, a transformed Kiruna needs to be attractive to both its inhabitants and investors. This necessitates an approach to urban planning that combines the preservation of iconic buildings with the construction of new ones. Erskine's architecture became part of the process of official heritagization – a process in which state authorities designate and protect physical objects as cultural heritage (Harrison, 2013). The same buildings are also subject of what Sjöholm (2016) termed de-heritagization, a process in which the official protection of cultural heritage is removed. The explanation of the de-heritagization of Erskine's buildings in Kiruna are practical – land deformations, technical difficulties and high costs for moving buildings, coupled with diverging views of their values among key stakeholders in the town's ongoing relocation process.

The fate of Erskine's buildings in Svappavaara has similarities to

Kiruna but also differences. As mentioned in the above, the main reason why Erskine's bold vision for the town was never realized, was LKAB's overestimation of how many new employees it would need. The population in Svappavaara peaked in 1975, when the settlement had just over 1000 inhabitants. In the years that followed the population decreased so that by the year 2000, the settlement had fewer than 500 inhabitants. The population decrease was partly a result of an increasing tendency among LKAB employees to live in the town of Kiruna and commute to Svappavaara. Another important reason was the mining company's decreasing need for employees at its mine, due to a recession in the global economy during the second half of the 1970's, which hit energy intensive industries like mining and steel manufacturing hard. The crisis affected LKAB, which responded by scaling down operations and reducing their workforce (Malmgren et al., forthcoming). In Svappavaara, LKAB closed mining entirely in 1984 but kept some of the production of iron ore pellets on the site. As low profitability in the mining sector continued through the 1990s, resulting in low interest in mining workers housing, Ormen Långe was used as emergency housing for refugees. Thereafter, many of the apartments were left empty and the building was in an increasing need of repairs. As a consequence, the municipal company owning Ormen länge applied for a permit to demolish parts of the building in 1999.¹

By this time, just like in the Kiruna case, Erskine's building complex in Svappavaara was already designated as a cultural heritage. The Swedish National Heritage Board had designated it as a part of a national interest area for cultural heritage protection, covering all of Svappavaara. The buildings were also designated as cultural heritage in the general plan of Kiruna municipality.² Neither of these heritage designations provided any strong legal protection, however. In this context a group of art historians from Umeå university proposed to the County Administrative Board of Norrbotten to declare Erskine's Ormen länge as a built heritage – one of the strongest forms of official heritage protection in Sweden.³ The group argued that Ormen länge was a highly valuable example of 1960's modernist architecture, based both on typical traits and unique features, including the neighborhood planning ideal of Lewis Mumford, traffic separation, and areas reserved for pedestrians and playing children. To the art historians, Erskine's complex at Svappavaara represented an important statement in the history of urban planning and social history of the 1960s. The unique values were embedded in Erskine's adaptation of these generalities to local features in the surrounding landscape at Svappavaara, the modest height of three stories, designed in a way providing variation within a very human scale. The design of the complex to provide maximum protection from the Arctic climate was a part of this unique trait. According to the Umeå group, this represented something completely opposite to the general trend in 1960s urban planning, in which new housing areas were usually established by flattening the ground with bulldozers, followed by the erection of rows of high rises, adapted to the constraints of construction cranes for mass production. Finally, the group argued, the fact that Ormen länge constituted remains from an architect that had become world-famous for his ideas on Arctic architecture.⁴

¹ "Bedömning av kulturhistoriskt värde och förslag till skyddsöreskrifter, Ormen länge, kv Bergsmannen 1, Svappavaara, Kiruna, Jukkasjärvi socken." Skrivelse från Norrbottens museum till Länsstyrelsen i Norrbotten, Kulturmiljöfunktionen, Luleå. 2000-11-07. Kiruna kommunars arkiv [Kiruna municipality archives].

² Ibid.

³ The scholars were Anna Elmén Berg, Esa K. Marttila, Lennart Pettersson, Katrin Holmqvist, Brit-Marie Andrén and Ann-Catrine Eriksson, all at Institutionen för konstvetenskap, Umeå universitet.

⁴ "Ang. anhållan om byggnadsminnesförklaring av Ormen länge, Bergsmannen 1, Svappavaara, Kiruna kommun". Kopia till Kiruna kommun av skrivelse från sex forskare verksamma vid Institutionen för konstvetenskap, Umeå Universitet. Vol. Bergsmannen 1, Kiruna kommunars arkiv [Kiruna municipality archives].

The County Administrative Board of Norrbotten gave the task of evaluating the heritage values of Ormen länge to the Norrbotten county museum, which submitted their assessment in November 2000. The museum made essentially the same evaluation of Ormen länge as the Umeå group had, but related it to a broader range of standard criteria for evaluating heritage values in the cultural heritage sector at the time. The museum arrived at the conclusion that Ormen länge had high heritage values in most categories and argued in favor of listing and protecting the building as a built heritage. The museum recommended strict regulations for the future management of Ormen länge, prohibiting demolition and requiring maintenance of all exteriors as well as public spaces in the interior of the building, carefully following original designs and materials. In addition the museum recommended strict regulations also for the single housing area of Erskine's design.⁵

Despite the Norrbotten museum's recommendations, the County Administrative Board of Norrbotten decided against protecting Ormen länge as a built heritage. The board agreed on some of the heritage values, but argued that from a regional perspective that: "Ormen länge appears primarily as part of a unique and unfinished project; a powerful reminder of the great gap between vision and reality." The slimmed version of the residential area represented a lack of holistic perspective. With so many elements missing compared to Erskine's original plan "Face to the South," Ormen länge had become a completely alien feature in the local environment. For this reason, the County Administrative Board assessed that Ormen Långe did not have such a high cultural-historical value that it would justify protecting it as a built heritage. The board did, however, remind Kiruna municipality that it would be possible to protect the buildings through its municipal planning.⁶

The Kiruna municipality did not follow the board's suggestion to protect Ormen länge in their plan for Svappavaara. In the years that followed Kirunabostäder proceeded with its plan and in the autumn of 2010 demolished the half of the building that was mostly affected by the years of neglect. The other half was renovated, and apartments made available to rent. In 2022, what remains of Erskine's Ormen länge is indeed a powerful representation of the discrepancy between his original vision for Svappavaara and the built environment that the decision makers in Kiruna municipality eventually created. The sad state of Erskine's face to the south is also a paradox. The decision to demolish it was taken several years into the same global mining boom that generated the transformation of Kiruna town - a boom during which LKAB decided to re-open mining again on a massive scale in Svappavaara, requiring new employees to work there. Against this background it appears that the ultimate explanation as to why the Erskine's Ormen länge was demolished is that neither LKAB nor the municipal authorities consider the Svappavaara settlement to be a strategic part of their large socio-technical system for mining anymore. It has become yet another place for simple extraction, with employees and contractors living somewhere else.

4. Erskine's legacy in Canada

Erskine's first foray in Canada was a contract with the Government of Canada in the 1970s. By that time, Erskine was recognized as an expert in Arctic architecture, and the Canadian government commissioned him to develop an architectural concept for Resolute Bay. Resolute Bay,

⁵ "Bedömning av kulturhistoriskt värde och förslag till skyddsöreskrifter, Ormen länge, kv Bergsmannen 1, Svappavaara, Kiruna, Jukkasjärvi socken." Skrivelse från Norrbottens museum till Länsstyrelsen i Norrbotten, Kulturmiljöfunktionen, Luleå. 2000-11-07. Kiruna kommunars arkiv [Kiruna municipality archives].

⁶ Länsstyrelsen i Norrbottens beslut gällande byggnadsminnesförklaring av Ormen länge, Bergsmannen 1, Svappavaara, Kiruna kommun. 2001-05-02. Länsstyrelsen i Norrbottens arkiv [The county administrative board of Norrbottens archive].

located on Cornwallis Island in the Canadian High Arctic, was established in 1953 by the Government of Canada to defend the northwest passage and assert Canadian sovereignty on these lands and waters (Tester and Kulchisky, 1994). This was implemented through the High Arctic Relocation program, where Inuit families from Northern Québec were relocated to strategic locations. Resolute Bay became one of these locations, and Inuit families from Inukjuak, a community 1500 km to the south, were brought to the site. This relocation led to many hardships for the Inuit, who had to live in tents and scavenge the dump for building materials and food, and were segregated from the white population (Marcus, 2011). By 1970, the government of Canada was promoting oil and mining exploration in the region and planned to increase the settlement to accommodate an influx of workers. Erskine was commissioned to design a new settlement that would better integrate Inuit with workers, scientists and the other transient populations.

Similar to Svappavaara, Erskine's design was based on a horseshoe "living wall" where seasonal workers and scientists would reside (Fig. 2). Nested inside this structure, the Inuit houses would thus be protected from the wind by the wall. Nevertheless, for some critics, this type of panopticon design would perpetuate spatial segregation and

could be seen as a human zoo (Marcus, 2011). Erskine hired a doctoral student to consult with local Inuit, but the general suspicion in the decisions by the Canadian government and the hardships created by the relocation trauma led to a high level of mistrust from Inuit in this initiative (Marcus, 2011).

Construction started in 1978, and again similarly to the case of Svappavaara, only a small part of the proposed by Erskine's vision was built. Moreover, the project was later abandoned, mainly due to economic reasons and serious doubts about the approach (Marcus, 2011; Sheppard, 2016, p. 111). The Inuit stayed in their original location, closer to their marine hunting grounds, and the building was eventually bought by a private investor and transformed into a hotel for the transient population.

Erskine's plan for the settlement in Resolute Bay can be seen as a failed experiment for several reasons. First, since the development of oil and gas never occurred in this part of Arctic Canada, the cost of the project became unjustifiable. More importantly, the utopian design was not supported by the local indigenous inhabitants, since it clearly was not well adapted to Inuit needs for ready access to the sea. Furthermore, Inuit had over the centuries developed their own building designs fully



Fig. 2. Erskine's original drawing for Resolute Bay. Retrieved from <https://www.sensesatlas.com/territory/resolute-bay-ralph-erskine-and-the-arctic-utopia/>.

adapting them to the harsh conditions of the Arctic environment that were very different from the Erskine's own ideas inspired by his Scandinavian experience (Hemmersam, 2021). Resolute Bay has never undergone an effort by any of the involved stakeholders towards heritagization, and nowadays represents a living example of poor planning practices studied by architecture students.

4.1. The making of high modernism in Fermont

Erskine's ideas were more fully implemented in the design of Fermont, a subarctic mining town in Quebec, located 1000 km north of Québec City in a region close to Labrador City, another mining town built in the 1960s. This area is also the traditional territory of the Innu people. The town of Fermont was planned by Quebec Cartier Mine (QCM), a Canadian US conglomerate created in the late 1950s to exploit iron deposits in Northern Quebec. In 1957, QCM had already created another mining town called Gagnon near the Lac Janine mine. This mining town was planned like a classic North American suburb with individual housing and big empty lots. Nevertheless, it appeared quickly that this town based on a North American suburban design was not well-adapted to the subarctic climate of the region, creating snowdrifts between the houses, which represented a set of serious challenges for the pedestrians.

The town was linked by a road to southern Quebec, and the iron ore was brought to Port-Cartier, on the St. Lawrence River, by a railway built by the company. However, the Lac Janine mine iron deposit was exhausted faster than expected, and QCM was looking to open a new mine 200 km further north, close to the Labrador border. In order to attract workers and avoid the problems created by deficient urban planning in Gagnon, QCM decided to build a concept town near the mine and hired a consortium to plan and design the town. The two architects working on the project, Maurice Desnoyers and Norbert Schoenauer, knew about Erskine's work in Svappavaara, and at the beginning of the project, Erskine himself acted briefly as a consultant, although he was

not involved in the actual design and realization of the project even if he was subsequently hired as a special consultant by QCM (Sheppard, 2011).

Fermont was designed according to three planning concepts: first, a compact urban land use pattern; second, a windscreens building principle; and finally, the provision of climate-controlled pedestrian access to community facilities (Schoenauer, 1976, p. 10). These principles of Arctic urban planning were clearly inspired by Erskine's work. In addition, since many families from Gagnon were supposed to move to this new town, the architects suggested implementing a participatory process. However, this process was limited to housing design and was not applied in the city planning (Sheppard, 2011).

The key feature of Fermont is the "mur-écran" or screen-wall, a continuous building 1.3 km long and 50 meters high at the center, inaugurated in 1974 (Fig. 3). The wall is arrow-shaped, pointing in the direction of the prevailing cold northwest winds. The building houses 344 apartments, a grocery store, a post office, an elementary and high school, a community radio station, as well as a hotel, a library, a restaurant/bar and various sports facilities (arena, pool, bowling alley, gym). The wall blocks the winds over a distance of 675 meters, which corresponds to 66% of the city's territory.

The other housing types are located behind the wall, with 80 townhouses directly behind, then 280 semi-detached houses and further away, 460 detached bungalows on small lots (Statistics Canada, 2017). The bungalows were not part of the initial plan but were added later at the request of families who wished to have access to the classic North American home. All the housing is constructed using the same materials and design, and only the size and color vary. Up to 60% of the town's inhabitants own their house, but they can only sell it to the mining company at a set price, and only people working at the mine can purchase or rent housing in Fermont. In practice, this means that the workers have to sell their house as soon as they retire; for that reason, there was no cemetery established in Fermont for a long time. The downside of this arrangement is a disincentive towards any house

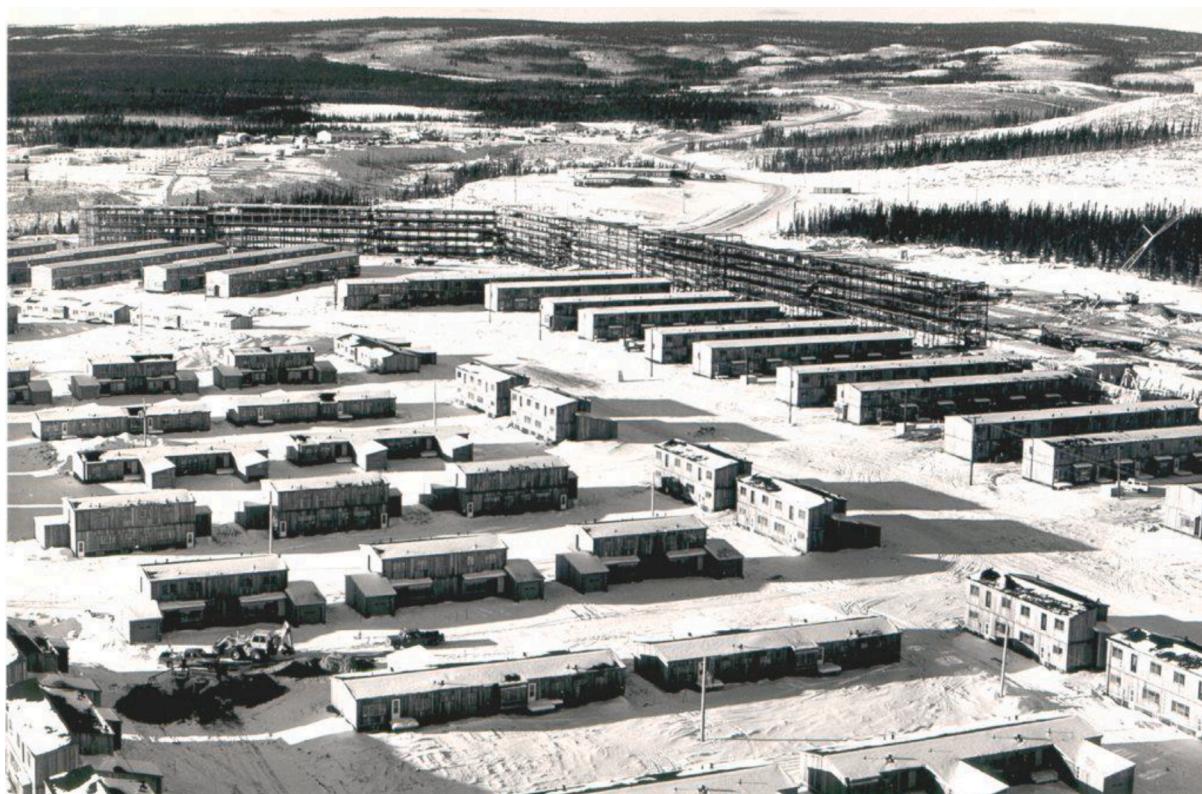


Fig. 3. Construction of the Fermont Wall. Source: La Presse (archives, June, 17 1971) and Ville de Fermont.

improvements and even to basic maintenance since most owners are not able to keep their house after retirement or pass it to their kids. However, those rules have been somewhat relaxed, and now retired people can request to stay in town—but with a shortage of housing this is not an easy process.

4.2. *The re-making process of Fermont*

The Fermont wall has been seen as an iconic feature of Northern Québec and is regularly featured in the media, and this can be seen as an unofficial heritagization. It is the only concept mining town in Québec, and it is still thriving, although, with the change in mining operations, it has lost some of its original character and function (Fig. 4).

Mining operations have continued throughout the years, and although ArcelorMittal acquired QCM production has been relatively constant even though the iron ore prices were quite low (Rodon, Keeling and Boutet, 2021). However, the population of Fermont has been constantly declining, from 3700 in 1986 to 2400 in 2016 (Statistics Canada, 2017). Two reasons explain this decline: increased mechanization and automation of mining operations and the increased use of “fly-in-fly-out” workers, who are not considered residents.

These trends accelerated dramatically with the mining boom that occurred in 2010. The iron ore price skyrocketed, inciting ArcelorMittal to increase production. In addition, a second mining site was opened by a US company, Cliffs Natural Resources, at Bloom Lake. This created an influx of new mining and construction workers. However, mining companies were now relying almost exclusively on “fly-in-fly-out” workers, as a much more flexible workforce. In order to lodge them during their shift, worker camps were built. In the case of ArcelorMittal, the camps are located near the Mount Wright mine, 25 km away from Fermont. However, in the case of the Bloom Lake mine, the company decided to build their camp in front of the wall, physically and metaphorically outside the original Fermont community.

Cohabitation between the long-time residents of Fermont and the

FIFO workers was quite tense at the beginning (Dion-Ortega and Blin, 2014). This influx of workers added pressure on the municipality's utilities (electricity and water), the health and social services provided by the town, with a population increasing to 5500 people with 2800 residents and 2700 non-residents FIFO workers (Pelletier, 2013). Moreover, since the FIFO workers are not residents of Fermont, they do not pay any local taxes despite using municipal services. Furthermore, the construction of the FIFO housing right in front of the wall has changed the original design, and a row of townhouses now obscures the wall. ArcelorMittal, who owns the town of Fermont, has agreed, under pressure from the union, to limit the use of FIFO workers in order to maintain the town (Dion-Ortega and Blin, 2014).

Nobody talks about destroying the wall despite these changes, since it symbolizes the town. If we analyze why Fermont's wall is still relevant even with the advent of FIFO workers, it should be stressed that mining activities have never stopped in Fermont, even if it went through low cycles. Furthermore, the wall fulfills a clear function by protecting the housing behind it and providing a controlled environment where people can fulfill most of their essential needs without going outside. Additionally, the fact that the people were consulted about the housing allowed for a better embrace of the town, which still provides some classical North American design. Finally, this is a unique feature in Canada, the only example of the wall building designed to protect other housing and as such is iconic for the town but also for the mining company.

All these elements have contributed to the design's success, but the future of this structure is still linked to the mining activities. It could become completely useless in case of the mine closure, due to the exhaustion of the ore or low ore prices since there are no other economic activities that would justify maintaining this settlement.

5. Comparing Erskine's legacy in Sweden and Canada

What explains the differences in historical trajectories of Ralph



Fig. 4. The wall with the different types of housing behind before the construction of the fly-in-fly-out housing (le Soleil, commercial rights).

Erskine's urban plans and architecture in Kiruna, Svappavaara, Resolute Bay and Fermont? A first important difference is how Erskine's ideas were implemented. At Svappavaara and Resolute Bay, Erskine's architecture and plan-designs were implemented to a very limited extent. Few of the planned buildings were erected, none of the societal services were provided. By contrast, in Fermont, most of Erskine's ideas on how to design Arctic cities were implemented and on a massive scale. The wall-shaped building contained everything from apartments of different size and comfort to shops, restaurants, bars and societal services, including sports facilities – much like Erskine's original plan for Svappavaara. Another difference is the size of the areas of single-family housing. In Fermont they amounted to an entire carpet of houses, protected behind the huge windscreen of the wall-shaped building. In Svappavaara, they were limited to only fifty buildings, barely protected against the wind by the slimmed version of the wall-building called Ormen länge.

A second striking difference is the widely diverging ways that Erskine's architecture and urban plans were handled in the decades following their construction. In Fermont, almost all buildings that were part of the original plan are still in place, in full use and well maintained. In Kiruna, Erskine's buildings will be demolished and remain only in the form of a documentation. In Svappavaara half of Ormen länge has been demolished. The differences can partly be explained by the different historical-geographical contexts in which these mining towns were built. In Quebec, the area in which Fermont was built in the 1970s consisted of vast forests with no settlements and no infrastructure which could be used to support mining operations in terms of energy and transport. In Norrbotten, Kiruna had already been a mining town for over 60 years and Svappavaara a village with a mining history going back to 1600s. Establishing Fermont was a matter of building an entire socio-technical system for mining from scratch, in which Erskine's urban design was one component. In Kiruna and Svappavaara, Erskine's urban design was an addition to a socio-technical system that was already in existence and had expanded with new mining industries and other economic activities for over half a century. Fermont exists in splendid isolation from other urban environments in Quebec, while Kiruna and Svappavaara are located relatively close to each other as well as to other mining towns and population centers in the Scandinavian Arctic, all connected by road and railway.

These differences must be taken into account when explaining the municipality's decision to only build a fraction of Erskine's design at Svappavaara. When the mining company decided to employ fewer new workers at Svappavaara, it didn't make any sense to the municipality to build housing that no one would use. Neither did it make much sense to provide societal services inside the slimmed-down version of Ormen länge, easily accessible to the residents of the 88 apartments but less so for others – services that in one way or the other were already available elsewhere. In Fermont on the other hand, services and housing – even excess housing capacity – simply had to be provided, because there were no other alternatives. Therefore, at Fermont, designing the settlement in the way Erskine had suggested was the only available solution.

The historical-geographical contexts also influence the differences in the way Erskine's buildings have been valued in the decades after they were built. In Fermont, when global mineral prices took off in the early 2000's, the mining company needed all the housing and service capacity the Erskine's inspired mining town could provide – and more. The boom brought a new additional mining company to Fermont, which further increased the housing needs. This company built new residential areas outside of the already existing Erskine designed complex, increasing the size of Fermont. In Svappavaara on the other hand, the mining boom did not result in any new housing needs – not in Ormen länge, nor anywhere else in Svappavaara. The most important reason was the relatively short distance from Svappavaara to Kiruna (45 km) and Gällivare (75 km), mining towns with housing and all of the services of the Swedish welfare state, and with airports facilitating fly-in-fly-out employees.

The Erskine houses in Svappavaara are merely facades that the mining company was once responsible for setting up. In the absence of a

development plan for the surrounding space connecting to his original design, the buildings became outdated and only valuable in the eyes of a segment of people who are passionate about 1960s architecture. The same cannot be said about the housing areas inspired by Erskine's ideas and fully implemented Arctic town of Fermont, where the apartments and services inside of the wall are well maintained, up-dated to present day standards, and therefore popular among mining company employees. Finally, in Kiruna, the mining boom is the ultimate reason as to why the Erskine's designed buildings will be pulled down. LKAB's expanded mining operations cause land deformations that will destroy the buildings.

What unites the fate of Erskine's architecture in Kiruna, Svappavaara and Fermont is the basic fact that the mining boom, in one way or another, have led to a significant alteration of these built environments over the last two decades. In Kiruna, the boom has forced a demolition and in Svappavaara reinforced the sense that the buildings represent failure and obsolescence. In Fermont, the boom has led to a substantial change in the way the town is experienced by inhabitants and visitors. The new residential areas sprawling across terrains surrounding the original town, particularly those outside of the wall, remove the experience of the wall as a protection against the cold winds of the Arctic.

It is also useful to consider the role of heritagization in the three cases. The built environments designed by Erskine in Kiruna were subject to official heritagization already from the mid-1980s, and remained protected until the final decisions connected to Kiruna's town transformation were taken in 2014. Despite all efforts, none of the buildings will be preserved. In the case of Svappavaara, those who argued for preserving Ormen Länge were heritage experts from the university and museum sectors, who tried to turn what remained of Erskine's building into legally protected cultural heritage. These efforts were not successful and only a small part of the apartment block is still remaining. The only place where the exceptionally visionary urban designs of Ralph Erskine prevailed and are in full use is the only place where they have *not* become subject of official heritagization – Fermont.

The examples chosen for this paper proved that the modernistic ideas in the Arctic in the northern part of Sweden were not necessarily gaining enough attention from the public authorities responsible for the protection of built heritage. Their attitude towards Erskine's buildings in both Kiruna and Svappaavara can be regarded as pragmatic. Despite the common understanding of the high cultural value possessed by these buildings the cost of relocation of apartment block in Kiruna and the upkeep of the building block of Ormen länge became too high. The citizens in both cases have not expressed a strong opinion in favor of protecting the buildings from demolition. The part of the apartment block that is left from Ormen länge has been refurbished and residents are happy to have a place to stay, but the settlement of Svappaavara is no longer an example of a lively modern space.

6. Conclusion

This study analyzed the variety of approaches connected to preservation and the modern-day use of Arctic modernist ideas presented by Ralph Erskine's pioneering ideas by using examples from Sweden and Canada. Despite the actual fate of the specific buildings in Sweden it is possible to mention that Erskine's legacy when it comes to the Arctic living environment continues to inspire architectonic solutions. The ideas of adaptations to the Arctic climate, energy-efficiency and the focus on the humans living environment are at core of both Erskine's and modern architects' work in this part of the world today.

We suggest that the explanation for this paradox is to be found in public notions of what cultural heritage is and what it is not, and how it should be used. A common occurrence among our informants in Fermont, was their expression of love for their town – from residents in the apartment in the Wall, to users of its social services to the decision makers in the town and companies. The wall is actually such a distinctive feature of the town that it is regularly featured positively in the

Quebec media. Furthermore, it has served its function of shielding the town from the harsh subarctic climate and from Fly-in Fly-out worker that are located outside of the wall protection. In Kiruna and Svappavaara however, neither residents nor urban planners seem to ever have loved Erskine's buildings. In the case of Svappavaara this lack of passion has very much to do with the fact that Erskine's original design was never put in place. Erskine himself was very disappointed with the end result. Scholars in urban history have even suggested that the contrast between the high expectations of the mine workers and the real living conditions they moved into when the building was ready in the mid-1960's, contributed to the historical strike in the iron-ore fields in 1969. Thus, popular passion for historical built environments – or unofficial heritagization – may under favorable economic and geographical circumstances, be just as important for the ability to preserve them as formal institutions for heritage preservation.

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