

DRAFT ARTICLE FOR > THE SITE MAGAZINE

How will green succeed in a grey world? Vernacular landscapes in the post-industrial town of Thetford Mines, Québec

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Introduction

For over 100 years, waste rock was piled next to the lucrative asbestos mines in southern Québec, (See Image 1).

Eventually, the tailing hills—or “dumps” as they are locally known—reached heights comparable to the region’s tree covered mountains. Their distinctive forms and steel-blue colour punctuate the built skyline and are clearly set apart from what is natural, yet they garner little attention from architectural and landscape scholars.

Vernacular studies of this and other mining regions typically focus on economic or domestic architectural space—the factories, processing plants, shafts, and housing—rather than the by-products of industry, like the pits and tailings, which are landscape spaces. These post-industrial scars, as geographer Anna Storm asserts, are significant physical reminders of past and present culture. (1) Following Storm, this paper pushes traditional readings of the everyday landscape to explore how the dumps are deeply entwined with the town’s local mining heritage. Drawing on archival photographs, we show how the dumps awaken the possibility for a greener future by finding the inherent beauty in this seemingly sterile landscape. First, in the photographs, we identify three topological forms in the dumps, as industrial advances and transportation technology promoted change in the height, width, and overall shape of the land. Next, we look at contemporary threats posed by the dumps, solutions considered by the town, and challenges of realizing the plans. Finally, the paper posits that traditions of mining and the inevitable greening of the tailings will guide a new vernacular reading of the landscape as the town diversifies its economy and literally rises above the dumps.

Spatial formation

Thetford Mines is a town built upon the shoulders of generations of men, women, and families, interwoven by asbestos, at varying intervals of industrial growth between 1876 and 2011 (See Image 2). For a town of 25,700, the legacy of mining exists in its sense of pride for the industry and labour history—a communal sentiment that helped found and support a regional museum, archive, and future interpretation centre. (2) The existing cultural facilities focus on labour movements and the working class, geology, and excavation processes and hold comparatively little information about the construction of the dumps. The proposed KB3 interpretation centre—named after the former King Beaver mine shaft number 3—promises an art installation and industrial relic garden between the mine shaft and the town. Meanwhile, from the elevated KB3 viewing platform, the attention of guests is drawn

down to the giant pit below, now filled with turquoise water, like a glacial lake. The tailings remain, like an uninvited guest, in the background. It seems that, even in the industrial afterlife, the dumps glean little attention. Still, this improbable landscape feature is inseparable from the town's mining history.

We know during peak production in the 1970s, the open pit mines at Thetford Mines, like those at neighbouring Black Lake and Asbestos (3), produced an equivalent of 100 tons of waste for every 1 ton of usable mineral. (4) Like the ownership of the pits and mills that frequently changed hands to remain operationally viable, the dumps too amalgamated, expanded, and morphed over time, essentially encompassing 14.5 km², or an area equivalent to over four times the size of New York's Central Park. (5) Notwithstanding the sheer expanse of the dumps, they also reach notable elevations.

Corporate records pertaining to the dumps are private property and inaccessible. Without access to topographical maps, the formation of this landscape is best established through archival photographs (See Image 3). When hundreds of aerial photographs, taken by dozens of photographers, are pieced together, they give us a perspective otherwise unseen from within the town. The archival photographs give us an elevated perspective to view and analyze the forms and, unlike the miners who worked below ground or townspeople who looked up at the dumps most of their lives, allow us to find an inherent beauty in this prevailing landscape. The photographs successively show how three typologies literally emerge from the waste rock. Each form is related to the technology employed in its making and these technologies varied among the different mine operators at different points in time. In other words, the sequence of visible typologies follows industrial investment, rather than a chronological timeline.

The extraction process evolves with technological advances, but always repeats the same basic pattern: blast and move, crush and separate. Late-19th century "White Gold" pioneers mined the region mostly by hand. They picked away at the ore and pushed medium sized boulders in carts over wooden planks to a mill. The rock was left to dry and then crushed by hand-held hammers, liberating the fibres. The most lucrative material was bagged and sent on horse-drawn wagons to existing railway connections for wider distribution. Meanwhile, the waste rock was set aside. Over time, larger areas were cleared as blasting techniques evolved, aiding the miners to more rapidly blast larger quantities of ore from the ground. (6) Push-carts and horse-drawn wagons gave way to aerial bucket lifts,

conveyor belts, locomotives, and eventually, by the 20th century, trucks did all the heavy lifting. (7) As the pits and production processes evolved, the amount of waste-rock grew, leaving three unique, and defiant, landscapes.

Boobies / Conical mounds

Late 19th and early 20th century photographs capture an early successional form in the waste dumps: simple conical shapes or “boobies.” Individual conveyors, extending from the mill, mechanically projected waste rock over the peak of these dump formations. The waste gained heights well above the mill’s roof and settled in a natural, but highly manufactured repose. Still, as if tied to the mill by an umbilical cord, the reach of a single conveyor limited scale and height of each cone, until conveyors were splayed (See Image 4). The cones morphed as a result, with wide, tumbling fronts and intricate, more rigid backsides. A long narrow procession of conveyors, like the boney spine of a slumbering dragon, produced sharp ridges along the backside of the mound. Junction points, reminiscent of complex hip roofs draining back toward the mills, increase the complexity of the forms by uniting one cone with the next. As a result, the front facades take on a softened scalloped form, compared to their narrow tail end that oscillates from varying vantage points.

Wedges

In the 1890s, locomotives were introduced to move material and a second, wedge shaped, landscape typology emerged. Long, wide, gentle waste-ramps materialized, as heavy railcars, limited by their incline, (8) distributed unwanted rock. Ramp widths were determined by the need for two tracks—one up and one down—and a broad turning radius at the top (See Image 5). Rail cars unloaded rock over the end of the wedge, creating tiered landforms that settled with steep but uniform slopes. As the wedges expanded, the rails were manually moved to one side and photographs depict the intensive track maintenance required to deploy materials. Soon, 100 ton trucks replaced rails, racing up steeper inclines, turning in smaller circles, and descending along the same route they ascended. Wedges became taller, narrower, and exponentially grander as their ever-widening forms toppled toward the town.

Terraces

Trucks were also employed to create the third notable configuration, the terraces. Some of the mining companies, like the King Beaver Mine, spread waste rock across unoccupied land near the pit and mill, layering up and out like a tiered-cake. These forms had the greatest spatial impact on their immediate neighbours as the terraces encroached on residential zones and engulfed nearby forested areas (See Image 6). Indeed, where topographical maps are unavailable, the archival photographs exemplify the spatial battles taking place. Smith Street is the most observable example as twice, over a twenty-year period, the residential street was shortened to half its size as houses were lifted and wheeled to safety. With more waste rock than space to put it, alternative uses for the tailings were found—in road beds and as backfill in other civil engineering works around the province. In Thetford Mines, sheer volume of displaced waste-rock literally reorganized the town.

Seemingly defiant of spatial limits, these tailings continually tiptoed across invisible barriers and needed to be reprimanded. (9) Localized erosion-control walls and concentrated greening along the Bécancour River and at the end of Smith Street stabilized the tailings at the base of the terraces (See Image 7). Still, other terraces, wedges, or cones, reaching great heights of 1400' or 425m, have unsettled slopes of up to 80%, continue to shift-shapes, and are unresponsive to revegetation. Additionally, any physical manipulation of dumps, sewers, and roads backfilled with waste-rock or tree removal, risks awakening lingering asbestos fibres. For a substance that once brought prosperity to the region, its by-product is like an unwanted white elephant: challenging to dispose of and costly to manage.

Barren beauties

Asbestos is a fibrous mineral that won the creative imagination of the Industrial Revolution leading up to the turn of the 20th century. When woven into a fabric, asbestos produces a fire-retardant substance with immeasurable strength. It supported efforts for both world wars, and by the 1960s and 1970s rapidly grew in popularity as the ultimate building material. Found unrivalled in public and private structures, asbestos fibres strengthened concrete, insulated walls, floors, and pipes, and was embedded in many, many finishes. Today, the World Health Organization recognizes all forms of asbestos, at varying degrees, as carcinogenic; it is banned in 40 countries worldwide, and is still the leading cause of death among asbestos workers in Québec. (10) Once promoted for its

near-supernatural ability to resist fire, the toxic legacy of the mineral has again caught the attention of the world over. Meanwhile, in Thetford Mines, the town is coming to terms with being in a post-asbestos phase by addressing their industrial past and the landscape their forefathers created around them (See Image 8).

The ancient Greeks first named the mineral to mean “inextinguishable” or “unquenchable,” a name well suited to a material that can defy heat and produces a by-product, waste rock, incapable of absorbing water. The material in dumps varies from site to site, but essentially, the particle composition is best described as a mix of fine gravel without significant mineral content. Although once thought to be a potential source for re-mining of heavy metals, the tailings have no known economic value. The voids between the particles are, in some cases, equal to the size of the granular material, allowing water to pass through the volume with little resistance, making the tailings “unquenchable” as first described by the Greeks. In other words, the tailings hills do not absorb water, rather water runoff destabilizes them further. Roads built on waste rock, in attempts to build safe viewing belvederes or lookout towers, have failed due to subsidence. In steeper slopes, heavy erosion is known to cause sudden avalanches and with unstable rock underfoot, there is an inherent danger assumed in approaching the mounds. (9) Beyond defying spatial boundaries and the health effects of potentially vagrant asbestos fibres, the dumps’ stability curtails recreational use. As result, the dumps are best experienced from a safe distance.

Left untouched, the ashen hills that surround the town may remain, as seen from a distance, like giant hippos peacefully nestled among the mountains. Some, resting in place for more than 100 years, have little-to-no vegetation regenerating over their magnificent ashen forms (See Image 9). They are blanketed in a 20 cm gray-blue crust, one that sets them apart from the region’s natural deep-green forest covered hills and disallows ecological replenishing. Large scale attempts to hydro-seed since 1980 have literally been slow to take off, with challenges of water retention and mineral content at the forefront. Other formulas of nutrient enriched pulp and paper sludge have been used, leaving residents to question, what will they try next?

Since April 2015, the region has been working with an international industrial soils company to re-green the area. Decontaminated soils from the 2013 Lac Mégantic railway disaster, mixed with seeds and other bio-treated and favourable soils are spread over the tailings. (11) The plan will take 8-10 years to implement, yet green corridors

are already visible along the highways into town. In addition to altering the industrial aesthetic, the revegetation project hopes to one day give the landscape back to its residents, in the form of public parks, forested areas, and even a lookout. These constant struggles attest to the patience, measured awareness, and resolve of local residents in commanding control over the lasting landscape of their industrial past.

The desire to rise above

Asbestos mining is not only the industry that bound the community together for over 100 years, it is also the enterprise that literally reformed the region (See Image 10). Described here as sleeping hippos and slumbering dragons, these massive forms encircle the town and fragment its core. Yet, until recently, most townsfolk have been able to see through the dumps with little attachment to this landscape. For the town to fully embrace its industrial past and navigate a greener future, these remnants must be addressed. On June 16th, 2014, the Town of Thetford Mines council approved a proposal to convert one of the remaining urban industrial complexes into an interpretation centre, outdoor theatre, public market, and viewing tower. In a heated three-hour debate, residents expressed both local pride and distain for the past, present, and future. The project offers a means to quench the town's thirst to reinvent itself, without extinguishing their mining heritage, and without asbestos. (12) Over the following two years, the town took control by decontaminating the site, stripping the KB3 tower of unwanted fibres, and stitching together opportunities to reflect on this history, with a new view over the landscape. For the first time, at the August 2016 grand opening, residents and visitors to the area will be able to observe the landscape as it is depicted in the archival photographs, from above and from a safe distance.

Advanced measures to "green" the tailings dumps will bring a much needed fresh perspective on the Town of Thetford Mines, as it tries to reinvent itself as a post-mining community. Enriched soils, spread over the dumps will support revegetation, which will in turn reduce erosion and blanket vagrant and/or hazardous airborne particles. These new layers will begin to cover the industrial scars, hold the dumps in place, and even camouflage them from the untrained eye. Still, the dumps will never completely disappear. They are unavoidably interwoven with the town's local mining heritage—the economic, technical, and labour history so prominently displayed in museums and archives—and embody the everyday process of extraction. The archival photographs have given us the ability to analyze the dumps from an elevated position, one not frequently or safely seen by locals or visitors. From

above, we find beauty and meaning in their seemingly uninteresting forms and reveal the missing story of their own construction. As these post-industrial scars heal, as their steel-blue forms submit to greener prospects, their vernacular forms will remain, to some, part of the town's industrial legacy.

. References

(1) Anna Storm. *Post-Industrial Landscape Scars*. (Place of Publication: Springer, 2014), page #

(2) Le Musée minéralogique et minier de Thetford Mines first opened on the centenary of the discovery of asbestos in the region. It opened with a geological collection and has since acquired photographs, tools, and mining equipment that helps retrace local extraction practices. Le Centre d'archives de la région de Thetford opened in 1984 and holds public and private collections, with few corporate records.

(3) For spatial evolution and conflicts in neighbouring towns, see:

W. Gillies Ross, "Encroachment of the Jeffrey Mine on the Town of Asbestos, Quebec" *Geographical Review* 57, no. 4 (October 1, 1967): 523-537.

Jessica van Horssen and Radha-Prem McAllister, "Asbestos, PQ: A Graphic Novel," *Megaprojects New Media*, accessed May 3, 2015, <http://megaprojects.uwo.ca/>.

(4) One ton of asbestos fibres produce approximately 60 tons of waste rock and overburden and 33 tons of tailings. T. R. Moore and R. C. Zimmermann, "Establishment of Vegetation on Serpentine Asbestos Mine Wastes, Southeastern Quebec, Canada," *Journal of Applied Ecology* 14, no. 2 (August 1, 1977): 589.

(5) Spatial area based on Moore and Zimmer, comparison based on Central Park covering an area of 3.41 km². Ibid.

(6) Asbestos mine operators used explosives to extract the mineral from the ore, and quickly developed innovative and inventive techniques that were exploited in other mining industries. For example, explosive techniques evolved from 19th century gunpowder, to 20th century dynamite, and eventually blasting techniques modernized ahead of many other industries by using nitrate-based, fuel-injected emulsions. "Comme on peut voir, dans le domaine de l'abattage comme dans bien d'autres, l'industrie de l'amiante ne cesse d'innover." Cinq-Mars François et al., *De la Pierre à Coton à la Fibre de Chrysotile: Plus de 120 ans d'Evolution dans les Mines d'Amiante* (Place of Publication: Musée Minéralogique et Minier de la région de l'Amiante, 1999), 71.

(7) Ibid. 85.

(8) Trains are limited to a 2% incline.

Ross, "Encroachment of the Jeffrey Mine on the Town of Asbestos, Quebec," 527.

(9) For an environmental history of neighbouring Town of Asbestos, see:

Jessica van Horssen, *A Town Called Asbestos: Environmental Contamination, Health, and Resilience in a Resource Community* (Vancouver: UBC Press, 2016).

(10) Reports indicate a total of 6 deaths between 1969 and 1995 on the slopes and in 2008, sadly a teenager died in a sudden avalanche. "Historique," *Avalanche Québec*, accessed May 8, 2015, <http://www.centreavalanche.qc.ca/a-propos/historique>.

(11) Even once they are decontaminated, post-industrial soils are kept away from agricultural lands and public spaces. Claudia Fortier, "Les sols décontaminés de Mégantic sur les haldes de Black Lake," *Courrier Frontenac*, Wednesday, December 2, 2015. Vol. 39, no.39 – 40 pages, 4.

(12) Off-record, some community members reflected on how the debate was a turning point for the town, where they were forced to address the challenges of living in a post-industrial landscape and embrace an uncertain future, with a positive outlook. As a result, the town voted to renew its cultural identity and began making changes, like the decision to remove the word "asbestos" from the name of the regional hospital.

List of figures:

All photographs were purchased from the Centre d'archives de la région de Thetford:

<http://www.sahra.qc.ca/>

Image	Caption	Title in archive	Photographer or commission	Date	Archive Reference Number
1	Aerial view of Thetford Mines, 1960	<i>Vue aérienne des installations de la King Beaver</i>	Canadian Aero Service Ltd.	1960	16303
2	Asbestos was discovered in the region in 1876 and continued until mines were permanently closed in 2011.	<i>British Canadian 1</i>	Marcel Cognac	n.d.	3428
3	Conveyor belts distributing waste-rock produce cones conical dumps, 1960	<i>Convoyeur de la mine Lac d'amiante</i>	Fonds André Brochu	1960	22590
4	Sharp ridges appear with the advanced use of conveyors	<i>Conveyeurs à la mine British Canadian</i>	Collection Clément Fortier	n.d.	8413
5	Locomotives produce wedges shapes with long, gentle slopes and wide, flat peaks	<i>View of the dump and Engines of the American Asbestos Co., Ltd., Black Lake</i>	Collection Clément Fortier	1910	12336
6	Terraced dump-landscapes	<i>King, Johnson, Bell, Beaver</i>	Canadian Pacific Air lines Ltd.	1945	3864
7 a	Property boundaries along Smith Street are blurred as the dumps spill over onto private property.	<i>Aerial of Bell mine,</i>	Collection Musée minéralogique et minier de Thetford Mines	1977	16606
OR 7 b	Retaining walls and hydro seeding hold the tailings in place at the foreshortened base of Smith	<i>Rue Smith</i>	Fonds Jean-Charles Poulin	1987	24128
8	Physical remnants of the industrial past cast lingering shadows over the landscape.	<i>Cimetière St.-Désiré</i>	Collection Renald Turcott	n.d.	16420
9	The dumps appear as harmless, giant sleeping hippos	<i>Terrils à Black Lake et puits de la mine British Canadian</i>	Collection Musée minéralogique et minier de Thetford Mines	1977	5607
10	The King Beaver 3 (KB3) tower sits roughly in the town's centre	<i>King Beaver</i>	Jacques Fugère	1960	2968

Pull Quotes:

1. Their distinctive forms and steel-blue colour punctuate the built skyline
2. even in the industrial afterlife, the dumps glean little attention
3. the sequence of visible typologies follows industrial investment, rather than a chronological timeline
4. A long narrow procession of conveyors, like the boney spine of a slumbering dragon, produced sharp ridges
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6. the terraces encroached on residential zones and engulfed nearby forested areas
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