

---

**Journal of the Society for the Study of Architecture in Canada**  
**Le Journal de la Société pour l'étude de l'architecture au Canada**



**Concrete Futures**  
**Extractive Legacies and Building Reuse in Canada**

Sarah Sheehan

---

Volume 49, Number 1, 2024

Architecture and Extraction  
Architecture et extraction

URI: <https://id.erudit.org/iderudit/1115136ar>

DOI: <https://doi.org/10.7202/1115136ar>

[See table of contents](#)

---

Publisher(s)

SSAC-SEAC

ISSN

1486-0872 (print)

2563-8696 (digital)

[Explore this journal](#)

---

Cite this article

Sheehan, S. (2024). Concrete Futures: Extractive Legacies and Building Reuse in Canada. *Journal of the Society for the Study of Architecture in Canada / Le Journal de la Société pour l'étude de l'architecture au Canada*, 49(1), 58–81.  
<https://doi.org/10.7202/1115136ar>

# Concrete Futures

## Extractive Legacies and Building Reuse in Canada

**SARAH SHEEHAN**

**Sarah Sheehan, Ph.D.**, is a writer interested in adaptive reuse, placemaking, and our built environment. Her writing has appeared in Canadian and international media including the CBC, *Ground*, and the *TLS*. She is also the lead editor of two scholarly books. In 2022, she was nominated for the ACO Heritage Awards A.K. Sculthorpe Award for Advocacy for her work on St. Giles church, while her project *Woodlands Park: Ghost Landscape*, a placemaking project funded by the City of Hamilton with a grant from the Patrick J. McNally Charitable Foundation, won a municipal award. Other advocacy work includes co-chairing Doors Open Hamilton 2022 and serving as founding Chair of Built Environment Hamilton. She is currently writing a book about church reuse.

Is brutalism Canada's national style? Popular in the 1960s and 1970s and named for its main building material, raw concrete (*béton brut*), the late-modernist architectural style holds a distinct meaning in Canadian culture.<sup>1</sup> Across Canada, postwar initiatives like federal building programs and the expansion of public universities yielded many brutalist buildings—even entire campuses—whose bold, monumental forms manifest the spirit of the Centennial era.<sup>2</sup> The significance of Canadian brutalism is indisputable, but this has hardly ensured its preservation. As a term denoting an architectural style, "brutalism" is contested and controversial. In this discussion, 'brutalist' will be used interchangeably with 'concrete-modernist' to denote the style of works in concrete *popularly understood* to belong to this subcategory of modernism. I adopt this definition according to mainstream reception in order to capture the intersection of material (concrete) and materiality (brutalist style) that is crucial to updating ideas of heritage and reuse amid the climate emergency.

Half a century since its Canadian moment, brutalism is enjoying a revival worldwide, even as a post-sesquicentennial Canada reckons with the twin legacies of settler colonialism and extractive capitalism. As author and activist Naomi Klein has argued, Canada is an extractive nation, shaped by a "voracious" consumption of natural resources, "careen[ing] from bonanzas to busts, from beaver to bitumen,"<sup>3</sup> while concrete, the main construction material used in the vast majority of brutalist buildings, is produced using sand, water, and aggregate (gravel): natural resources that have historically been presented as limitless, but whose wide-scale extraction globally has been revealed as unsustainable.<sup>4</sup>

Construction and property development are extractive industries, not just in their extraction and consumption of natural resources, but in their drive to increase and accelerate consumption of those resources, as wilderness is claimed for development and existing buildings are demolished to build new. The architectural profession materially depends on these industries, which emerged within an extractive-capitalist socioeconomic paradigm—*conspicuous consumption, planned obsolescence, or a take-make-waste model*—that construes buildings as disposable, prefers greenfield to greyfield, and measures economic growth by an increasingly rapid cycle of construction and demolition. A popular example of this is the Crane Index, which measures a city's economic vitality through the number of highly visible construction projects. A parallel phenomenon, that of visually documenting the spectacle of demolition, suggests a cultural fascination with the relationship between traumatic rupture, growth, and waste within the urban fabric (fig. 1).<sup>5</sup> In analyzing obstacles to reuse, the National Trust for Canada found that since the postwar period, successive governments have incentivized new construction, as opposed to sustainable reuse, through policies structured to favour the greatest resource consumption.<sup>6</sup> Extractivism is the opposite of sustainability, yet in a postcolonial resource economy like Canada's, its operations are highly mystified. As Canadians work to reduce their collective carbon footprint, an important step will be to divest from extractive development, and embrace reuse.



**FIG. 1.**  
A PHOTOGRAPH DOCUMENTING  
THE DEMOLITION OF THE  
PROVINCIALY SIGNIFICANT,  
FIRST HAMILTON PUBLIC  
LIBRARY, HAMILTON, ON, 1955.  
COURTESY OF HAMILTON SPECTATOR  
COLLECTION, LOCAL HISTORY &  
ARCHIVES, HAMILTON PUBLIC LIBRARY.

The large-scale, resource-intensive nature of brutalist works makes it clear: architectural conservation is a form of sustainability. As late-modernist buildings enter their 'heritage' years during a climate emergency, architects, architecture critics, heritage professionals, and advocates for preservation have all criticized the wasteful status quo of demolition and issued an urgent call for building reuse as climate action.<sup>7</sup> Historically, a persistent public ambivalence toward mid-century concrete structures has encouraged their neglect and destruction, even when they meet the highest standards of heritage value. This destruction of highly durable, concrete-heavy, and often nationally significant buildings was predicated on an acceptance of waste—despite the public's strong support for sustainability and climate resilience. However, in the mid-2010s, the Paris Agreement contributed to a more widespread awareness of the climate crisis, including greenhouse gas (GHG) emissions and carbon footprints, and this has informed a broader understanding of natural and architectural conservation. Recent reuse and renewal of brutalist buildings in Canada suggests a shift from extraction to sustainability. In this article, I provide a preliminary discussion of concrete and its role in Canadian brutalist architecture; second, I examine Canadian understandings of heritage and waste in the context of the climate emergency; and finally, I consider five case studies of brutalist renewal from across the country, undertaken before and after the 2016 Paris Agreement. Taken together, the case studies hint that this shift may rely nominally on established ideas of heritage (cultural) value, but that it nonetheless conveys an implicit rejection of material extraction and waste. Examples are considered with attention to their original context, including heritage status, interior design, and site-specific art, and in terms of how the architects for these renewal projects describe the buildings' style, ordered chronologically by renewal.

## Concrete modernism: materials and meaning

Brutalist architecture was originally designed to convey utopian socialist ideals and a futurist spirit. Today, it is their materials and materiality that loom the largest: brutalism worldwide is

inextricably associated with concrete. Embraced by modernist architects, concrete has a long history that goes back to Roman times. By the early twentieth century, cast “concrete stone” could also replace carved ornamentation on a cost-intensive, revivalist work like the neo-Gothic former St. Giles Presbyterian church in Hamilton by the local firm Stewart & Witton, 1912.<sup>8</sup> The integration of site-specific art into many concrete modernist projects suggests that the building material is well-suited to modern expressions of the *Gesamtkunstwerk* (‘total artwork’ as a unified multimedia artistic program). As the American architect Danforth W. Toan (1918–2013), a partner architect on the original Robarts Library, observed, “Concrete is the same as the Gothic tradition—the same material inside and outside.”<sup>9</sup> The use of exposed concrete connects brutalism to its broader, modernist context, while today, the oft-cited phrase “corduroy concrete”<sup>10</sup> functions to reference past fashions and thus the style’s temporal specificity. Recent years have seen a shift in the terminology used to denote the architectural style, with a receding of the term ‘brutalist’ in favour of ‘modernist’ or simply ‘concrete,’ indicating a focus on materials and materiality.<sup>11</sup> The British publisher Blue Crow Media published two Canadian maps in the late 2010s, entitled *Concrete Toronto Map* and *Carte Montréal Béton / Concrete Montreal Map*.<sup>12</sup> The brutalism website GreyScape hosts a “Concrete Community” section, and the wide-ranging #SOSBrutalism project uses the tagline, “Save the Concrete Monsters.”<sup>13</sup> Taking place primarily online, this global revival plays a role in the documentation and study of modernist architecture worldwide—while also blurring and confusing the definition of ‘brutalism’ as an architectural term and category.<sup>14</sup>

Concrete has a huge carbon footprint: its production is deeply enmeshed in global extractivism. The climate emergency has increased awareness of the extent to which modern concrete relies on heavy resource extraction, while also contributing to flooding and the loss of natural habitats. In 2019, Guardian Cities hosted a Concrete Week publication series, highlighting the global environmental issues associated with sand and aggregate mining. As Jonathan Watts, the *Guardian*’s global environment editor, wrote, “After water, concrete is the most widely used substance on the planet.” Considering the magnitude of worldwide concrete use, he also notes that “[a]ll the plastic produced over the past 60 years amounts to 8bn tonnes. The cement industry pumps out more than that every two years.”<sup>15</sup> In early 2022, the *Toronto Star* published a two-part investigation by Noor Javed of Ontario’s aggregate mines’ devastating environmental impact.<sup>16</sup> Post-extraction transportation of construction materials adds more emissions. Efforts to reduce the construction and demolition waste associated with concrete include innovations in manufactured sand and recycled aggregate, although, like other recycling processes, these innovations are often energy-intensive.<sup>17</sup> The emissions from mining and construction are significant: as I wrote in a widely shared opinion piece,

Half the world’s carbon emissions are from extractive industries such as mining; in the last 15 years, emissions increased the most from the extraction of non-metallic minerals associated with construction, such as sand, clay, and gravel. In fact, demand for concrete is so high that we’re running out of sand. [...] Also known as embodied emissions or embodied energy, embodied carbon refers to the total energy expended—invested—in a building’s construction, from extraction of natural resources, manufacturing, and transportation, up to final completion of a new structure. This carbon investment accounts for up to 50 per cent of a building’s greenhouse gas (GHG) emissions over its entire lifespan, even for buildings constructed with the most sustainable, up-to-date methods and materials.<sup>18</sup>

As members of the growing climate heritage movement argue, the most sustainable response to the extractive, emissions-heavy construction industry, is reuse: to design for green retrofits of existing buildings.

From the future-defining Centennial projects of the 1960s to later associations with urban decay and monotony, to recent celebratory, institutional retrospectives for Canada 150, the public's perspective on brutalism in Canada has swung widely.<sup>19</sup> Two scholars of brutalism in Canada, Réjean Legault and Jeffrey Thorsteinson, are producing valuable insights into the interplay between modernism and nationalism, the built environment, nature, and the sublime.<sup>20</sup> Further, now that Canadian brutalism is being taught in the academy, new generations of decision-makers have the opportunity to understand its value. Architectural historian Annmarie Adams explains:

When I teach brutalism in my course at McGill to first year architecture students, I tell them to think of it like rock and roll music. It was irreverent, it broke down hierarchies, it democratized. It's outspoken, the architectural equivalent of free speech ... It was really a new vision for the late 20th century. There are really good things about it. It screams accessibility.<sup>21</sup>

As one of Canadian brutalism's inherent qualities, this accessibility is not limited to the present day, but is evident in the strong, positive impressions of the style remembered by many from childhood. The prominence of brutalist public buildings in Canadian cities, and thus in Canadians' lived experience, makes them potent vessels of meaning and memory, especially for those young enough to have visited them as children.<sup>22</sup> Writer and editor Russell Smith has strong childhood memories of brutalist architecture in the form of "the university buildings I grew up around, their smell of cloister and grown-ups"; in addition to this sensory memory, he also remembers his father's pride in his onetime workplace, the Killam Memorial Library, Halifax:

It looks, from the outside, like a windowless bunker—a flak tower or a techno-medieval keep. But I remember my father's excitement and pride in the new building. Light came from the glass-walled inner courtyard, he liked to explain, and there was a stream going through it, and common areas with sofas all along those windows, and so on. It was a vast new amenity. It was progress.<sup>23</sup>

The response of Smith's father centred on the library's interior, and his positive experience of the building as a worker. Scholar and urbanist Sarah Gelbard has emphasized how brutalist architecture is often defined by its interiors: "warm, welcoming, cozy spaces" that would be keenly missed if lost.<sup>24</sup> Discussing Ottawa's brutalist buildings, she describes them as profoundly human gathering places, whose design and materials embody what has been identified as one of the style's central qualities—honesty:

They are admittedly hard to relate to from the outside but they are experts at creating relationships from within. [...] They are also great celebrations of architecture as artform. They are sculptural and honest in the way they bear the marks of the geometry through which they were designed and the materials with which they were made.<sup>25</sup>

Social perspectives and recollections of *how* a brutalist building was and is used, testify to an aspect of their materiality that is fundamental, but too often overlooked. These emphatic accounts show how human experiences reinscribe each brutalist work as a locus of affect, invested with emotion and memory.

As buildings that express a national style, Canadian brutalist works are unique; the cultural specificity of Canadian brutalism makes its expression distinct from that of other nations, such as France and the United Kingdom, where the style is strongly associated with post-war rapid and affordable housing.<sup>26</sup> Despite the importance of the style nationally, modern



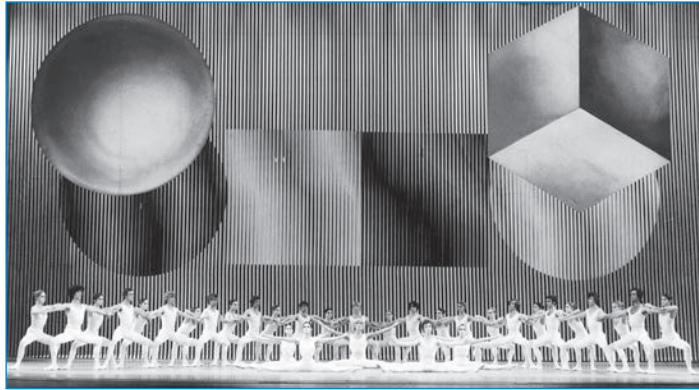
**FIG. 2.**  
THE JAPANESE CANADIAN  
CULTURAL CENTRE, LATER  
THE NOOR CULTURAL CENTRE,  
NORTH YORK, ON, C. 1963,  
BY RAYMOND MORIYAMA.  
JAPANESE CANADIAN CULTURAL CENTRE  
2001.710. COURTESY OF THE JAPANESE  
CANADIAN CULTURAL CENTRE.



**FIG. 3.**  
AUDITORIUM OF THE JAPANESE  
CANADIAN CULTURAL CENTRE,  
C. 1963, BY H.R. JOWETT.  
COURTESY OF MORIYAMA &  
TESHIMA ARCHITECTS.

(re)interpretations risk compromising these structures' design integrity, or approach their key features, such as enclosed interior spaces or monumental massing, as problems to be fixed. Discussing the University of Toronto's exposed-concrete athletic centre, known to students as "Fort Jock" (Prack & Prack, 1979; Oleson Worland Architects, 1998), architecture professor Larry Wayne Richards is critical of what he construes as its hard-edged aloofness, how "its internalized nature causes it to ignore the surrounding streets," but commends a new café addition as "a first positive step toward softening the building's urban edges."<sup>27</sup> Extractive-capitalist redevelopment that seeks to retain only the minimum of an existing building (e.g. repurposed deconstructed building components, or facadism, in which only one or two facades are retained) are particularly ill-suited to brutalist buildings, as the proposed redevelopment of Raymond Moriyama's Japanese Canadian Cultural Centre shows (figs. 2 and 3). Referencing both Japanese temples and internment camps, and one of Canada's most meaningful concrete-modernist works, this early, Toronto-area commission of Moriyama's is threatened by a residential tower project which could see it "reduced to

fragments," as architecture critic Alex Bozikovic writes, its interior spaces lost.<sup>28</sup> Structured by extractivism and perceiving lower profits in 'heritage' or reuse, many developers regard even the most unique and unambiguous architectural value with indifference. Yet interior spaces play a crucial role in brutalist works, especially institutional public buildings like those considered here. Documentary photography of brutalist interiors vividly conveys the futurism and confidence of these buildings in use (figs. 4–6).



**FIG. 4.**  
ARTISTS OF THE BALLET IN  
*KRAANERG* FOR THE OPENING  
OF THE NATIONAL ARTS  
CENTRE, OTTAWA, ON, 1967,  
BY ANTHONY CRICKMAY.  
COURTESY OF THE NATIONAL  
BALLET OF CANADA.



**FIG. 5.**  
INTERIOR VIEW OF THE  
MCMASTER UNIVERSITY  
MEDICAL CENTRE, HAMILTON,  
ON, 1971, BY CRAIG, ZEIDLER  
& STRONG ARCHITECTS.  
COURTESY OF HAMILTON SPECTATOR  
COLLECTION, LOCAL HISTORY &  
ARCHIVES, HAMILTON PUBLIC LIBRARY.

## Heritage versus waste: existing buildings as climate assets

November 2022 marked the fifty-year anniversary of the UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage, a landmark 1972 agreement that represented the merging of the natural and cultural conservation movements.<sup>29</sup> However, Canada—an extractive nation that is still, to a considerable extent, defined by its resource economy—has been slow to enact protections of the built environment.<sup>30</sup> Canadian policy makers have historically been heavily invested in the extraction paradigm, an investment evident in the policy bias against heritage protection, i.e. restrictions on property 'rights'



FIG. 6.  
INTERIOR, THOMAS FISHER  
RARE BOOK LIBRARY, 2013,  
BY GORDON BELRAY.  
COURTESY OF UNIVERSITY OF  
TORONTO LIBRARIES.

like demolition. At the time of writing, Canada remains the only G7 nation to lack protections for federally significant heritage buildings.<sup>31</sup> Canadian ideas of 'heritage' emerged from an extractive-capitalist paradigm that valorizes rarity—often a side-effect of loss—and assumes that most buildings will be demolished. If heritage legislation relies on capitalist ideas of scarcity and glut, a sustainability-minded focus on materiality offers a way forward, by re-envisioning all existing buildings as climate assets.

Surviving modernist buildings stand to benefit from a recent shift in sustainability thinking, from new construction to green retrofits.<sup>32</sup> While many builders previously focused on LEED-certified new construction as a solution to sustainability concerns, the architecture and development industries are pivoting towards green reuse of existing structures. James Lindberg, a past director of the National Trust's Preservation Green Lab, explained in the 2021 collection *Preservation, Sustainability, and Equity*: "The urgency of reducing embodied carbon emissions inverts common perceptions about older buildings and climate change. Rather than being seen as outdated structures that we hope to replace, older buildings should be valued as climate assets that we cannot afford to waste."<sup>33</sup> As sustainable construction think tank director Jennifer O'Connor explains in her TEDx talk "Save buildings, fight climate change," the Three Rs—Reduce, Reuse, Recycle—are an important sustainability principle that can be applied to existing buildings. She describes how the United Nations commissioned a comparison study in order to decide whether to reuse its Manhattan headquarters (Harris & Abramovitz with UN Board of Design, 1952)—a modernist complex designed by an international board of architects that included Le Corbusier and Canadian Ernest Cormier (1885–1980). According to O'Connor, "The results were clear: upgrading the existing buildings made more sense than tearing them down and building new... [a]voiding demolition and new construction prevented the emission of 50,000 metric tons of GHGs."<sup>34</sup> As the UN study coauthors observed:

While there were clearly multiple reasons to justify renovation of our iconic, classical, mid-century modern masterpiece, the sustainability aspect of the decision has tended to be overshadowed by the historical, cultural, and architectural considerations. In large part this is because the sustainability benefits are not easily quantified, and are therefore typically acknowledged on an intuitive basis (e.g., preservation saves "many tons" of material), rather than quantitative. When reviewed in more detail, however, the benefits of renovation are substantial enough to warrant further consideration.<sup>35</sup>

In the shift to climate resilience, existing buildings were initially seen as incompatible with sustainability; but with data-driven study, the building sector can now consider them part of the solution.

Green retrofits gained a broader public understanding, and a new urgency, with the Paris Agreement in 2016. The United Nations made the decision to renew their New York headquarters, based partly on climate science, in the first decade of the new millennium; then, in 2015–16, the UN-initiated Paris Agreement further articulated and quantified ideas around carbon footprints and embodied carbon, or upfront emissions. “[I]ts overarching goal is to hold ‘the increase in the global average temperature to well below 2°C above pre-industrial levels’ and pursue efforts ‘to limit the temperature increase to 1.5°C above pre-industrial levels’” by reducing greenhouse gas emissions.<sup>36</sup> Architects have increasingly adopted the reuse imperative in the years following the Paris Agreement. The awarding of the 2021 Pritzker Architecture Prize to the sustainability-minded French firm Lacaton & Vassal clearly shows the currency of their motto, “Never Demolish”; indeed, the prize jury quoted Lacaton, expanding on it, and in the process, articulating a powerful critique of demolition and waste:

Transformation is the opportunity of doing more and better with what is already existing. The demolishing is a decision of easiness and short term. It is a waste of many things — a waste of energy, a waste of material, and a waste of history. Moreover, it has a very negative social impact. For us, it is an act of violence.<sup>37</sup>

Lacaton uses the phrase “easiness and short term” to denote market forces, or extractivism; energy and material, as well as history, are not to be wasted. Instead of waste, and the violence and negativity of demolition, reuse is a positive force—an opportunity for transformation rooted in the existing fabric.

Waste is a tangible concept; it is the flip side of the more abstract ‘conservation,’ countering the cycle of conspicuous consumption with a preindustrial wisdom: *Waste not, want not*. Within contemporary discourses of architecture and sustainability, waste may be overtaking earlier heritage thinking based on the idea of loss—a complex and often fraught concept enmeshed in traditions of mourning. Planned obsolescence builds loss<sup>38</sup> (of heritage, of building materials) into the development cycle, whereas zero-waste asks: how might we avoid squandering precious resources, like existing buildings? Waste heritage expert, architect, and professor Susan Ross argues that the measurable concept of waste can present an effective challenge to the extractive status quo:

[B]y the 20th century architects had completely bought into a real estate process that had made obsolescence its rallying cry, not yet recognizing how unsustainable the cycle of destruction and construction can be. In contrast to this status quo, our arguments made connections to sustainability as a matter of course, invoking waste as much as loss.<sup>39</sup>

When a work of architecture is endangered, predictable debates often ensue about the value of built heritage; each iteration of this debate is informed by changing ideas of loss and waste. In place of a naturalized loss of resource-intensive, existing buildings, the concept of “waste” is inclusive, in renewing an appreciation for value that is informed by both materials (sustainability) and meaning (heritage). Fortunately, like the UN, Canada’s public institutions are already predisposed to avoid waste, as our case studies will show.

## Reinventing brutalism in Canada: five case studies

How are Canadian brutalist renewal projects adapting late-modernist buildings for the present? In the case studies below, the key is not heritage protections or the repairs needed, but institutional public ownership. With the exception of the Grand Théâtre de Québec, none of these structures was renovated due to urgent conservation issues. Under the extractive-capitalist privileging of 'real property' (land) ownership, a property owner's desire to retain, or demolish, an existing building generally takes precedence over any official protections or material challenges. In other words, the land is real, but the value or even acknowledgement of any structure on it depends on the ownership. In planning terms, official heritage status, such as provincial heritage designation or National Historic Site status, can expedite retention and reuse by limiting the option to demolish and providing more incentives for retrofits.<sup>40</sup> Yet a brief survey of these institutional brutalist renewal projects, undertaken across Canada in the last fifteen years, suggests that legislated heritage protections are not a pattern with successful brutalist reuse; rather, what emerges is a picture of late-modernist public spaces updated with twenty-first-century aesthetics and values, such as sustainability, openness, and accessibility, in mind. Examples surveyed, in order of renewal, include the McMaster University Health Sciences Library and the Central Library & Farmers' Market, both located in Hamilton; Robarts Library at the University of Toronto; the Grand Théâtre de Québec; and, currently underway, the Contemporary Calgary gallery at the former Calgary Centennial Planetarium.

These case studies were chosen to cover an interval from before the Paris Agreement to around the time of the UN headquarters renewal, to range from eastern to western Canada, to include a variety of uses, and to account for urban centres both more and less favourable toward extractivism or heritage conservation. Two examples of brutalism in Hamilton—a post-industrial city rich in architecture, but historically known for its permissive environmental standards and laissez-faire attitude to conservation and development—saw renewal in the early 2000s; the first, a McMaster building, is by a major Toronto architect, while the second, the central library complex, is by a local firm. The third, fourth, and fifth case studies were all Centennial projects. In downtown Toronto, the multi-stage renewal of the Robarts research library spanned the years before and after the Paris Agreement, following extensive renewal of the St. George campus in the early 2000s. In Quebec City, the recent award-winning renewal of the Grand Théâtre de Québec represents a unique approach to conservation and stewardship, with glass used to protect, rather than open up, the brutalist structure. Finally, the ongoing art gallery conversion of the former Calgary planetarium presents a different picture of the case for reuse in a western Canadian context, one in which brutalism's characteristic design features functionally suit the new cultural use. With the exception of the Grand Théâtre de Québec, none is heritage-protected; however, each is valued as a *modernist* work, and thus as a built-heritage asset available to be transformed for productive public use. Similar to the United Nations decision to renew its modernist complex, public institutions that retain their buildings as a matter of course show the long-term viability and material value of existing buildings.

In our first Hamilton case study, renovations to the library of McMaster University's brutalist health sciences building saw the insertion of a glass reading room pavilion on the inner quadrangle. Architect Eberhard Zeidler (1926–2022) designed the McMaster University Medical Centre (MUMC), now known as the McMaster University Health Sciences Centre (Craig, Zeidler & Strong Architects, 1972; McCallum Sather Architects, 2007), as a highly

FIG. 7.  
MCMaster UNIVERSITY  
MEDICAL CENTRE DURING  
CONSTRUCTION, 1971,  
BY DE BRUYN.  
COURTESY OF HEALTH SCIENCES  
ARCHIVES, MCMaster UNIVERSITY.



innovative teaching hospital. Zeidler's futuristic, concrete design rejected the established high-rise hospital format in favour of a flexible, low-rise, modular structure that incorporated glass utility towers and interstitial space for mechanical components (fig. 7).<sup>41</sup> English architectural critic and writer Reyner Banham (1922–1988) called the building "the quintessential megastructure hospital."<sup>42</sup> When it opened in 1972, the new MUMC drew local crowds and international visitors. In a 1971 preview, the *Hamilton Spectator* published photographs of children and young people in the brightly coloured interiors, including "psychedelic corridors" lined with undulating cast-concrete walls by sculptor Ted Bieler (figs. 8–10; see also fig. 7).<sup>43</sup> Annmarie Adams, who specializes in healthcare architecture, reads Zeidler's MUMC as reflecting the era's optimism, noting that "[i]t was very much part of the exciting, almost utopian culture of the early 1970s."<sup>44</sup> Despite the significance of Zeidler's work, when the City of Hamilton designated the university's Collegiate Gothic 'historic core' in 2008, the designation did not include the (by then partly renovated) MUMC.<sup>45</sup> In 2007, McCallum Sather Architects (MSA) renovated the Health Sciences Library, located in the rear of the complex, and added the two-storey, lantern-like Jan and Mien Heersink Reading Pavilion (fig. 11). According to MSA director Drew Hauser, the original Health Sciences Library was "surrounded by windowless, concrete walls. The 1971 built structure was state-of-the-art, but had grown outdated."<sup>46</sup> The library renovation replaces concrete with glass to emphasize light and openness.<sup>47</sup> Neither Hauser nor the McCallum Sather website mention brutalism. The renovation reveals what will emerge as a pattern for several of our institutional updates: radically revising concrete-modernist interiors by adding large expanses of glass, all in the name of neoliberal values like competition, and especially 'transparency.'

In downtown Hamilton, the brutalist Central Library and Farmers' Market also received a glass addition in the form of a contemporary mezzanine linking the two storied municipal institutions. The Central Library and Farmers' Market (Anthony Butler and Brook Carruthers Shaw Architects, 1980; RDH Architects Inc. with David Premi Architects, 2011) combined the main library and market, and integrated both into the sprawling, 1960s-era shopping mall complex known as Lloyd D. Jackson Square; the market replaced a 19th-century structure that had been destroyed by fire, while the library was the city's third central library building (see fig. 1).<sup>48</sup> Years in the making, the concrete library-and-market complex was a later addition

**FIG. 8.**  
A STUDENT SEATED IN THE  
LIBRARY OF THE MCMASTER  
UNIVERSITY MEDICAL CENTRE,  
HAMILTON, ON, 1971, BY CRAIG,  
ZEIDLER & STRONG ARCHITECTS.  
COURTESY OF HAMILTON SPECTATOR  
COLLECTION, LOCAL HISTORY &  
ARCHIVES, HAMILTON PUBLIC LIBRARY.



**FIG. 9.**  
CHILDREN SEEN IN A PLAY ROOM  
OF THE MCMASTER UNIVERSITY  
MEDICAL CENTRE, HAMILTON,  
ON, 1971, BY CRAIG, ZEIDLER  
& STRONG ARCHITECTS.  
COURTESY OF HAMILTON SPECTATOR  
COLLECTION, LOCAL HISTORY &  
ARCHIVES, HAMILTON PUBLIC LIBRARY.



**FIG. 10.**  
A SECURITY GUARD SEATED  
BEFORE ONE OF ARTIST TED  
BIELER'S CONCRETE WALLS  
INSIDE THE MCMASTER  
UNIVERSITY MEDICAL CENTRE,  
HAMILTON, ON, 1971, BY CRAIG,  
ZEIDLER & STRONG ARCHITECTS.  
COURTESY OF HAMILTON SPECTATOR  
COLLECTION, LOCAL HISTORY &  
ARCHIVES, HAMILTON PUBLIC LIBRARY.



FIG. 11.  
JAN AND MIEN HEERSINK  
READING PAVILION, HEALTH  
SCIENCES LIBRARY, WITH THE  
MCMASTER UNIVERSITY HEALTH  
SCIENCES CENTRE, HAMILTON,  
ON, 2007, BY MCCALLUM  
SATHER ARCHITECTS.  
COURTESY OF MCCALLUM  
SATHER ARCHITECTS.



to the megadevelopment, which cleared over one hundred early buildings from the historic core.<sup>49</sup> When it opened in 1980, a contemporary critic strongly approved of the design and focused on the interior space. Noting the building's strikingly "odd shape [...] like a slightly demented pyramid," critic Michael Quigley praised its "lightness" and "restraint," drawing a contrast with both the adjacent Jackson Square and the "eye-shocking abstract designs" inside Zeidler's MUMC.<sup>50</sup> Where the heavy "dark browns [of] Stelcoat facing" characterized the Jackson Square complex, which also includes Stelco Tower (C.F. Lau Architects, 1973), the 1980 structure was described in terms that ascribe to it a benevolent otherworldliness: "the library building is lighter: it looks less solid, less imposing, less dominating than the others, almost as if it could levitate itself."<sup>51</sup> The library interior was what mattered most to Quigley, whose approbation focused on the interior finishes, including concrete pillars, and the "gentle and restful" mood they created.<sup>52</sup>

The year McMaster University's Health Sciences Library renovation was completed, the City of Hamilton opted to restore, and not demolish, its International-Style, heritage-designated City Hall (Stanley Roscoe, 1960; Garwood-Jones & Hanham Architects, 2010).<sup>53</sup> Renewal of the municipally owned Central Library and Farmers' Market soon followed. At the time of David Premi Architects' renovations between 2009 and 2011, the building did not have listed status.<sup>54</sup> The firm refreshed the interior, retaining the concrete pillars and central blue ceramic tile, moved the entrances, and added a distinctive glass mezzanine along York Boulevard, with a green wall installed near the library entrance (fig. 12). A closeup of this glass addition was featured on the cover of *Canadian Architect* magazine with the heading, "Hamilton's New Face" (fig. 13). Like Hauser and MSA, Premi omits discussion of architectural style, and instead emphasizes openness and connection—both between the library and market, and with pedestrian and vehicular traffic on the busy downtown street.<sup>55</sup> The glass-heavy facelift was seen as successful in opening and transforming the library into a hub, in line with contemporary values.

In downtown Toronto, the multi-stage renewal of the Robarts complex saw a glass pavilion added to the rear of the library tower: an addition planned beginning in the early 2000s, but only recently opened for student use. At the centre of the University of Toronto's St. George campus, the John P. Robarts Research Library, Claude T. Bissell Building, and Thomas Fisher



**FIG. 12.**  
CENTRAL LIBRARY & FARMERS'  
MARKET SEEN FROM YORK  
BOULEVARD, HAMILTON, ON,  
2011, BY DPAAI WITH RDH.  
COURTESY OF DPAAI.



**FIG. 13.**  
COVER OF *CANADIAN  
ARCHITECT*, VOL. 56 NO.  
10 (OCTOBER 2011): GLASS  
ADDITION TO HAMILTON'S  
CENTRAL LIBRARY &  
FARMERS' MARKET WITH  
VIEW INTO MARKET INTERIOR,  
2011, BY TOM ARBAN.  
COURTESY OF RDH ARCHITECTS  
/ CANADIAN ARCHITECT.

Rare Book Library (Warner Burns Toan & Lunde with Mathers & Haldenby, 1973; Diamond Schmitt Architects, 2022) is a legendary brutalist complex: a fourteen-storey, triangular concrete tower with two smaller, radiating hubs for the Faculty of Information and rare book collection (fig. 14, see also fig. 6).<sup>56</sup> According to Richards, it was conceived as the university's "showstopping" Centennial project.<sup>57</sup> As conservation architect and scholar James Ashby has observed, Robarts was part of a trend of modernist libraries added to Canada's established university campuses that merits further study:



**FIG. 14.**  
ROBARTS LIBRARY COMPLEX,  
SEEN FROM THE CORNER  
OF ST. GEORGE AND  
HARBORD STREETS, ON THE  
CONCRETE TORONTO MAP,  
2018, BY JASON WOODS.  
COURTESY OF ERA ARCHITECTS  
/ BLUE CROW MEDIA.

Critical attention has focused on the new campuses and centennial projects, rather than the impact of the Modern Movement on existing campuses [...] In the 1960s and 1970s, academic libraries experienced a renaissance, with new central or divisional libraries constructed on every major university campus in the country. For new as well as existing universities, these library buildings represented modernity, technological advancement, and growth, and provided opportunities to establish new or renewed identities.<sup>58</sup>

Known affectionately as “Fort Book,” the complex was listed by the City of Toronto in 1997.<sup>59</sup> Extensive renewal of the downtown campus in the early 2000s included significant additions and renovations to existing facilities, like the modernist E.J. Pratt Library, Victoria College (Gordon Adamson & Associates, 1960; Shore Tilbe Irwin and Partners with Kohn Shnier Architects, 2004), and a new master plan for Robarts.<sup>60</sup> As part of the university’s multi-stage revitalization of its research library, Diamond Schmitt Architects added a third pavilion to this triangular megastructure (fig. 15): Robarts Common, a five-storey, floating glass structure that has its own entrance and is connected at multiple points to the main tower (fig. 16).<sup>61</sup> The firm’s notes describe the contemporary addition as a “counterpoint” to the original’s “monolithic” brutalism:

Set against the austere west façade of the library, Robarts Common establishes a transparent counterpoint to the Brutalist expression of the original architecture—a monolithic concrete volume. Its massing draws influences from the triangular geometries of the Fisher and Bissell pavilions, as referenced in the glass faceted façade. It reveals the student activity within and invites the university community inside.<sup>62</sup>

Like Hamilton’s updated brutalist libraries, Robarts Common creates a contrast between the original 1970s design and libraries’ current ideals of openness and accessibility. As *The Globe and Mail*’s columnist Marcus Gee summarized: “Instead of cloistered fortresses for safeguarding books, they are becoming teeming hubs for group learning and inventive

**FIG. 15.**  
SITE PLAN SHOWING ROBERTS  
LIBRARY COMPLEX WITH THREE  
PAVILIONS, 2021, BY DIAMOND  
SCHMITT ARCHITECTS.  
COURTESY OF DIAMOND  
SCHMITT ARCHITECTS.



**FIG. 16.**  
ROBERTS LIBRARY WITH  
ROBERTS COMMON, 2021,  
BY DIAMOND SCHMITT  
ARCHITECTS.  
COURTESY OF DIAMOND  
SCHMITT ARCHITECTS.



study.”<sup>63</sup> Interestingly, it was found that the original plans allowed for three pavilions, making Diamond Schmitt’s addition a kind of completion, but in a contemporary “transparent” style. Hidden on the side of the triangle furthest from St. George Street, Roberts Common relies heavily on glass, but still respects the landmark’s heritage qualities by leaving the original brutalist massing intact.

In Quebec City, an important brutalist theatre saw the addition of large quantities of glass, but as part of the sophisticated conservation of its mid-century concrete. Performance venues were an important Centennial project category, and the Grand Théâtre de Québec (Victor Prus, 1971; Lemay and Atelier 21, 2020) is one of several brutalist cultural centres that are now part of the National Historic Sites of Canada (fig. 17).<sup>64</sup> Victor Prus’ rectilinear, concrete design includes a sunken garden, and is complemented by a monumental interior relief by Catalan-Québécois artist Jordi Bonet (1932–1979). In 2017, the theatre held a design

**FIG. 17.**  
A CANADIAN CENTENNIAL  
PROJECT, THE GRAND THÉÂTRE  
DE QUÉBEC, QUEBEC CITY,  
QC, C. 1971, BY VICTOR PRUS.  
COURTESY OF THE GRAND  
THÉÂTRE DE QUÉBEC.



**FIG. 18.**  
THE RENOVATED GRAND  
THÉÂTRE DE QUÉBEC,  
QUEBEC CITY, QC, 2021, BY  
LEMAY AND ATELIER 21.  
COURTESY OF STÉPHANE GROLEAU.

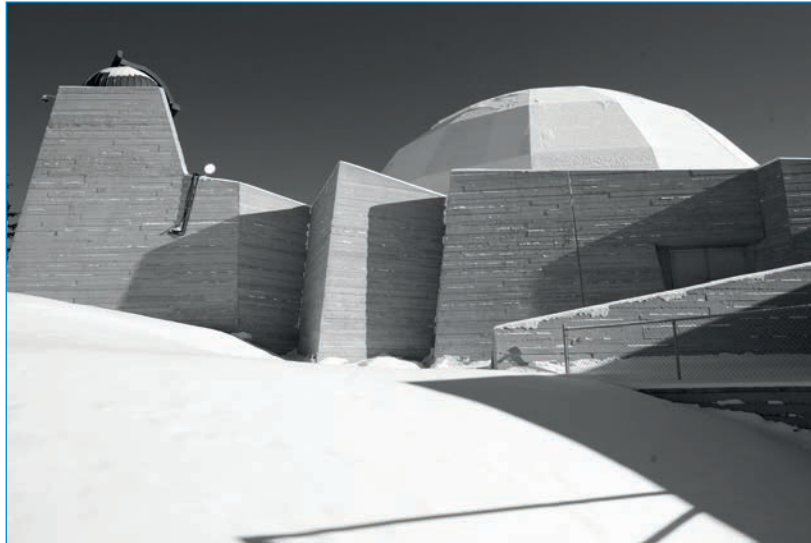


competition to address the challenge of severe weathering to the reinforced concrete structure. Lemay and Atelier 21's winning proposal added a protective shell of glass suspended in a complex steel armature<sup>65</sup> (fig. 18). The project won the 2021 Royal Architectural Institute of Canada Innovation Award; the jury commented:

À l'épineuse question de la préservation de l'enveloppe de béton préfabriqué du Grand Théâtre de Québec et de la célèbre murale de Jordi Bonet qui y est imbriquée, les architectes ont proposé une réponse audacieuse, avec un pari d'intervention loin d'être gagné d'avance. On a choisi de sertir le bâtiment brutaliste de Victor Prus dans une enveloppe innovante à plusieurs égards. Ce nouvel écrin tout en transparence met littéralement et symboliquement en lumière une œuvre moderniste majeure de la ville de Québec, pérennisant et actualisant par là sa valeur patrimoniale.<sup>66</sup>

Accessibility was maintained throughout construction, as the theatre remained open while gaining a "modern, conserving cocoon."<sup>67</sup> The revitalization of this Quebec Centennial

**FIG. 19.**  
EXTERIOR OF THE  
CONTEMPORARY CALGARY ART  
GALLERY / FORMER CALGARY  
CENTENNIAL PLANETARIUM,  
2022, BY MCMILLAN LONG  
AND ASSOCIATES.  
COURTESY OF GERARD YUNKER /  
CONTEMPORARY CALGARY.



**FIG. 20.**  
RENDERING OF  
CONTEMPORARY CALGARY  
PHASE TWO EXHIBITION  
WING, 2018, BY KPMB.  
COURTESY OF KPMB.



project explicitly values brutalism as functional cultural heritage. According to this brutalist structure a conservationist's care—putting 1970s concrete behind glass—has the effect of elevating the once-humble building material.

In Calgary, the vacant 1960s planetarium remained ideal for use as a cultural attraction, with a new contemporary wing taking the pressure off the brutalist structure. The Calgary Centennial Planetarium (McMillan Long and Associates, 1967; Gibbs Gage Architects and KPMB, 2020–) represents another important Centennial project category: the science centre.<sup>68</sup> The windowless, municipally-owned brutalist building, which previously housed the Calgary Science Museum, is currently in mid-renovation for cultural reuse. Contemporary Calgary, a merger of three organizations—the Museum of Contemporary Art Calgary, the Art Gallery of Calgary, and the Institute for Modern and Contemporary Art—is implementing a two-phase plan to transform Jack Long's 1967 planetarium into a gallery for modern and contemporary art (fig. 19). Phase one involved renovations to the interior and the addition of an entrance pavilion, while phase two will see construction of a new exhibition wing, intended to meet the requirements of international exhibitions, with a rooftop sculpture garden (fig. 20).

In discussions of the gallery conversion, the building's functional "windowless[ness]" was repeatedly cited as an advantage for the cultural reuse: phase one may have added an entrance pavilion, but it showed appreciation and respect for brutalist aesthetic integrity. Media coverage of the project referenced "optimism" and modernist, not brutalist, style: CBC Calgary conveyed praise for the "modernist" building,<sup>69</sup> while in a media release, architect Bruce Kuwabara referred to the Centennial Planetarium as "an icon of optimism," framing art, and the project itself, in competitive terms ("game-changing" and referencing "thought leadership") when he observed,

Contemporary art has the power to be a leading force in how we perceive and think about society and the world. The reimagining of the Centennial Planetarium—an icon of optimism—into a dynamic, game-changing cultural hub, is an ideal project of architecture in our time.<sup>70</sup>

The rhetoric of competition signals its extractive-capitalist ideology and, as noted above, Alberta's heritage regulations are rooted in extractivism.<sup>71</sup> Instead, the emphasis in this brutalist reuse project was resolutely on the future—on cultural value, continued functionality, and the contemporary prestige of an updated built resource.

### **From zero-sum to zero-waste: concrete accountability and the pragmatics of reuse**

These five examples of brutalist reuse in Canada span years of increasing awareness of the climate emergency. In each case study, institutional discourses of renewal and reuse may mention modernist architectural style, but seldom reference climate resilience or the sustainability of reuse: in other words, there is no explicit anti-extractivism or refusal to demolish. Ontario libraries and healthcare, a Quebec City theatre, an Alberta planetarium turned art gallery—as Canada's concrete modernist buildings pass the half-century mark, those fare best whose community value is well-established. As with the United Nations and their conscious decision to renew, and not demolish, their existing modernist complex, budget-conscious public institutions who reuse their buildings, apparently as a matter of course, show the long-term viability and material value of the built environment. Renewal of this extractive, concrete architecture may not be framed in climate-resiliency terms, but the increasing policy for reuse shows a recognition of opportunity to meet the goals of the present. Naomi Klein speaks of the "existential attack" felt by members of the extractive Canadian establishment when challenged by advocates for sustainability.<sup>72</sup> Klein's formulation also resonates for conservation advocates like myself: caught in a high-conflict, zero-sum game, abstractions and established hierarchies prevail, and the physical world slips from view. Perhaps the most radical reminder to embrace materiality comes from traditional modes focused not on consumption or competition, but collectivity and collaboration. As a form of sustainability, building reuse speaks to an enduring cultural value, much older than extractive capitalism: gratitude, not just for shared communal space, but for our world's finite, precious resources.

## Notes

1. On Canadian architecture and brutalism, see Lam, Elsa and Graham Livesey (eds.), 2019, *Canadian Modern Architecture: 1967 to the present*, New York, Princeton Architectural Press; and Polo, Marco and Colin Ripley (eds.), 2014, *Architecture and National Identity: The Centennial Projects 50 Years On*, Halifax, Dalhousie Architectural Press.
2. Perhaps because the style's heyday coincided with nation-wide celebrations of a century of Confederation, Canada's brutalist architecture is mainly institutional: centres for the performing arts like the first Centennial project, the Fathers of Confederation Buildings, now the Confederation Centre for the Arts, Charlottetown (Affleck, Desbarats, Dimakopoulos, Lebensold, Sise, 1964), the National Arts Centre, Ottawa (Affleck, Desbarats, Dimakopoulos, Lebensold, Sise, 1969), and the Royal Manitoba Theatre Centre, Winnipeg (Number Ten Architectural Group, 1970); university campuses like Scarborough College, University of Toronto (John Andrews, 1964), Simon Fraser University, Burnaby (Arthur Erickson and Geoffrey Massey, 1965), Trent University, Peterborough (Ronald James Thom, 1968), and the University of Lethbridge, Alberta (Arthur Erickson, 1971); and libraries for public and post-secondary systems such as Killam Memorial Library, Dalhousie University (Leslie R. Fairn, 1971), Central Branch, Ottawa Public Library (George Bemis and Associates, 1973), and Murray Library, University of Saskatchewan (BLM Architects, 1976).
3. "Canada was an extractive company—the Hudson's Bay Company—before it was a country. And that has shaped us in ways we have yet to begin to confront. Because such enormous fortunes have been built purely on the extraction of wild animals, intact forest and interred metals and fossil fuels, our economic elites have grown accustomed to seeing the natural world as their God-given larder. When someone or something—like climate science—comes along and says: Actually, there are limits, we have to take less from the Earth and keep more profit for the public good, it doesn't feel like a difficult truth. It feels like an existential attack." Klein, Naomi, 2016, "Canada's founding myths hold us back from addressing climate change," *The Globe and Mail*, September 23, [https://www.theglobeandmail.com/news/national/canadas-founding-myths-hold-us-back-from-addressing-climate-change/article32022126/], accessed October 1, 2022.
4. On the politics of concrete, see Jappe, Anselm, 2020, *Béton: Arme de construction massive du capitalisme*, Paris, Éditions L'échappée, p. 200.
5. On demolition see Heathcote, Edwin, 2021, "Demolition's creative destruction of the cityscape," *Financial Times*, January 10, [https://www.ft.com/content/8f7195af-b1ff-47cb-ac1d-ae485cf5f056], accessed January 27, 2021.
6. See Wiebe, Chris, 2021, "Making Obsolescence History: Confronting Barriers to Accelerate Building Reuse in Canada," *National Trust for Canada*, June 15, [https://nationaltrustcanada.ca/online-stories/making-obsolescence-history-confronting-barriers-to-accelerate-building-reuse-in-canada], accessed October 1, 2022.
7. Sheehan, Sarah, 2022, "Save a building, fight climate change," *CBC Opinion*, January 26, [https://www.cbc.ca/news/opinion/opinion-climate-building-demolition-1.6325677], accessed October 1, 2022. On 'heritage' defined as a minimum of forty years old, see Lam, Elsa, 2022, "Viewpoint: Young Heritage," *Canadian Architect*, vol. 67, n° 2 (April), p. 4.
8. Richardson, A.E., 1916, "St. Giles Presbyterian Church, Hamilton, Ont.," *Construction: A Journal for the Architectural, Engineering and Contracting Interests of Canada*, vol. 9, n° 12 (December), p. 418-20. Sheehan, Sarah, 2020, "Let's not bulldoze Hamilton's east-end St. Giles church," *The Hamilton Spectator*, December 11, p. A19 [https://www.thespec.com/opinion/contributors/2020/12/11/lets-not-bulldoze-hamiltons-east-end-st-giles-church.html], accessed October 1, 2022.
9. Toan, Danforth of Warner, Burns, Toan & Lunde, 1966, quoted in "Concrete Interiors," *Progressive Architecture*, (October), p. 215, cited in Ashby, James, 2019, "The D.B. Weldon Library by Andrews and Murphy: Modern Experiments in a Collegiate Gothic Campus," *Journal of the Society for the Study of Architecture in Canada*, vol. 44, n° 2, p. 35.
10. The phrase is attributed to American architect Paul Rudolph (1918–1997) and his work. Frampton, Kenneth, 1968, "Place Bonaventure," *Architectural Design*, vol. 38, n° 1, p. 42, quoted in Legault, Réjean, 2011, "The Idea of Brutalism in Canadian Architecture," In Rhodri Windsor Liscombe (ed.), *Architecture and the Canadian Fabric*, Vancouver, University of British Columbia Press, p. 324.
11. Cohen, Jean-Louis, 2006, "Modern Architecture and the Saga of Concrete," In Jean-Louis Cohen and Gerard Martin Moeller, Jr., (eds.), *Liquid Stone: New Architecture in Concrete*, New York, Princeton Architectural Press, p. 20-32. McClelland, Michael and Graeme Stewart, 2007, *Concrete Toronto: A Guide to Concrete Architecture from the Fifties to the Seventies*, Toronto, Coach House Books, 353 p. Concrete Toronto, 2013, "Concrete Toronto: Cultural amnesia about concrete architecture," *Spacing*, July 11, [http://spacing.ca/toronto/2013/07/11/concrete-toronto-cultural-amnesia-about-concrete-architecture/], accessed October 1, 2022. Although brick brutalist works form an interesting subset of the style ('brickalism'), most brutalist buildings are structural concrete, to the extent that the distinctive material qualities of precast concrete have come to define the style. Henley, Simon, 2017, *Redefining Brutalism*, Newcastle upon Tyne, RIBA Publishing, p. 65-86. In Canada, one of the most celebrated examples of brutalism, St. Mary's Church of the Immaculate Conception in Red Deer, Alberta (Douglas Cardinal, 1968) is of brick construction; so is the at-risk Sir John A. Macdonald Secondary School, Hamilton (Prack & Prack, 1970). Even a brutalist work as important as Cardinal's church was subject to what the architect deemed an unsympathetic alteration: see Hanna, Deirdre, 2002, "Cultural Evolution," *Canadian Architect*, September 1, [https://www.canadianarchitect.com/cultural-evolution/], accessed February 28, 2023.
12. Blue Crow Media, "Brutalist Calendar 2024," [https://bluecrowmedia.com/products/brutalist-calendar], accessed April 8, 2023; ERA Architects, (ed.), with photography by Jason Woods, 2018, "Concrete Toronto Map," London, Blue Crow Media; Vanlaethem, France, (ed.), with photography by Raphaël Thibodeau, 2019, "Carte Montréal Béton / Concrete Montreal Map," London, Blue Crow Media.

13. See #SOSBrutalism, [https://www.sosbrutalism.org], accessed October 1, 2022. See also the travelling exhibition at Yale School of Architecture Gallery. Yale School of Architecture, "SOS BRUTALISM—Save the Concrete Monsters!" August 25, 2022 – December 10, 2022, [https://www.architecture.yale.edu/exhibitions/113-sos-brutalism-save-the-concrete-monsters], accessed October 1, 2022. In 2018–19, important examples in Ontario, including the National Arts Centre (1966) and Eberhard Zeidler's McMaster Health Sciences Centre (1972), were not yet included in the SOS Brutalism project. The author contributed four Ontario examples to the SOS Brutalism online resource: The National Arts Centre, Ottawa (1966); the School of Architecture, Carleton University (1972); McMaster University Medical Centre, Hamilton (1972); and Hamilton Central Library & Farmers' Market (1980). See Sheehan, Sarah, 2019, Twitter @DrSarahSheehan, February 7, [https://twitter.com/DrSarahSheehan/status/1093558179391258624], accessed October 1, 2022.
14. Thank you to the anonymous reader of this paper for highlighting this.
15. Van Mead, Nick, 2019, "A brief history of concrete: from 10,000 BC to 3D printed houses," *The Guardian*, February 25, [https://www.theguardian.com/cities/2019/feb/25/a-brief-history-of-concrete-from-10000bc-to-3d-printed-houses], accessed October 1, 2022; Watts, Jonathan, 2019, "Concrete: the most destructive material on earth," *The Guardian*, February 25, [https://www.theguardian.com/cities/2019/feb/25/concrete-the-most-destructive-material-on-earth], accessed October 1, 2022.
16. Javed, Noor, 2022, "It's not a good industry to have": Ontario's lax rules leave local taxpayers on the hook for aggregate mine cleanup," *Toronto Star*, March 2, [https://www.thestar.com/news/gta/2022/03/02/its-not-a-good-industry-to-have-ontarios-lax-rules-leave-local-taxpayers-on-the-hook-for-cleanup-of-aggregate-mines.html], accessed October 1, 2022.
17. Watts, 2019.
18. Sheehan, 2022.
19. See Polo, Marco and Colin Ripley (eds.), 2014, *Architecture and National Identity: The Centennial Projects 50 Years On*, Halifax, Dalhousie Architectural Press, p. 96. David Cronenberg's *Stereo* (1969) filmed at Scarborough College, Toronto, while *Shivers* (1975), *Rabid* (1977), and *Scanners* (1981) were filmed in Montreal. See Smith, Justine, 2018, "Why David Cronenberg's Montreal—in all its modernist glory—is the creepiest city in cinematic history," *National Post*, October 25, [https://nationalpost.com/entertainment/why-david-cronenbergs-montreal-in-all-its-modernist-glory-is-the-creepiest-city-in-cinematic-history], accessed October 1, 2022. See Komar, Sierra, 2023, "Sex, Lies, and Architecture: Brutalism and the Search for Sexual Truth in David Cronenberg's *Stereo*," *Textual Practice*, vol. 37, n° 1: p. 1-19.
20. Legault, p. 313–40. Thorsteinson, Jeffrey, 2016, "Only Half an Architecture: Nature, Nation, and Interpretations of Modern Architecture in Canada," *Journal of Society for the Study of Architecture in Canada*, vol. 41, n° 2: p. 51–64. See also Thorsteinson, Jeffrey, 2012, *Brutalist Architecture in Winnipeg*, Winnipeg, Winnipeg Architecture Foundation, 53 p. Reviewed by Landrum, Lisa, 2015, "Brutalist Architecture in Winnipeg," *Canadian Architect*, vol. 60, n° 6 (June), p. 31.
21. Annmarie Adams quoted in McNeil, Mark, 2022, "Wild ideas in concrete—McMaster's hospital at 50," *The Hamilton Spectator*, October 4, [https://www.thespec.com/news/hamilton-region/flashbacks-hamilton/2022/10/04/mcmaster-hospital-turns-50.html], accessed October 21, 2022.
22. See Canadian reviews of Phaidon's 2018 *Atlas of Brutalist Architecture*: Blanthorn, Jon Scott, 2019, "Atlas of Brutalist Architecture," *Canadian Architect*, vol. 64, n° 5 (May), p. 57–58; Zeller, Javier, 2022, "Growing Up Modern," *Canadian Architect*, vol. 67, n° 5 (August), p. 62–63.
23. Smith, Russell, 2019, "The Enthusiast: Embracing the brutal in Brutalist architecture," *The Globe and Mail*, September 22, [https://www.theglobeandmail.com/arts/article-the-enthusiast-embracing-the-brutal-in-brutalist-architecture/], accessed October 1, 2022.
24. Pritchard, Trevor, 2015, "Beautiful brutalism: why one Ottawa urbanist thinks concrete can't be beat," *CBC Ottawa*, November 5, [https://www.cbc.ca/news/canada/ottawa/beautiful-brutalism-ottawa-1.3303475], accessed February 28, 2023. Gelbard's Ottawa walk included what she identified as brutalist landscape architecture: "The Garden of the Provinces and Territories along Wellington Street was opened in 1962 as an example of a public space that also incorporated elements of brutalism."
25. Gelbard, Sarah, 2015, "UrbSanity: Brutal heritage," *Spacing Ottawa*, January 16, [https://spacing.ca/ottawa/2015/01/16/auto-draft], accessed February 28, 2023.
26. In Canada, brutalist housing tends to be less affordable: see Moshe Safdie's Habitat 67, Montreal (1967) and the proposed redevelopment of Raymond Moriyama's (1929–2023) Japanese Canadian Cultural Centre, North York (1963). On the exhibition "*Brutal and Beautiful: Saving the Twentieth Century*" by English Heritage, Wellington Arch, Hyde Park Corner, London, see Booth, Emily, 2013, "The brutalist and the damned," *Architects' Journal*, October 5, [https://www.architects-journal.co.uk/news/the-brutalist-and-the-damned], accessed October 1, 2022. Adams, David and Peter Larkham, 2022, "Contesting Urban Monuments: Future Directions for the Controversial Monumental Landscapes of Civic Grandeur," *International Journal of Heritage Studies*, vol. 28, n° 8, p. 891–906. McLeod, Virginia, and Clare Churly (eds.), 2018, *Atlas of Brutalist Architecture*, London, Phaidon Press Limited, p. 18, 22. Of the examples discussed in this paper, only two, the Japanese Canadian Cultural Centre (1963) and the Grand Théâtre de Québec (1971), are included in the widely reviewed *Atlas of Brutalist Architecture* (figs. 2, 3, 17).
27. Richards, Larry Wayne, 2009, *University of Toronto: The Campus Guide*, New York, Princeton Architectural Press, p. 172 & p. 85–87.

28. Moriyama's Japanese Canadian Cultural Centre was listed in 2006 and is the proposed site of a residential high-rise. See Originate Developments website, 123 Wynford Drive, [https://originateinc.ca/project/123-wynford/], accessed October 21, 2022; Hanna, 2002, op. cit.; Bozickovic, Alex, 2023, "Why the Japanese Canadian Cultural Centre must be saved," *The Globe and Mail*, February 4, [https://www.theglobeandmail.com/canada/article-why-the-japanese-canadian-cultural-centre-must-be-saved], accessed February 28, 2023; and Micallef, Shawn, 2023, "The Raymond Moriyama-designed Japanese Canadian Cultural Centre is a Toronto landmark that deserves to be saved," *Toronto Star*, February 10, [https://www.thestar.com/news/gta/2023/02/10/the-raymond-moriyama-designed-japanese-canadian-cultural-centre-is-a-to-ronto-landmark-that-deserves-to-be-saved.html], accessed February 28, 2023. See also Ede, Carol Moore, with introduction by Arthur Erickson, 1971, *Canadian Architecture, 1960/70*, Toronto, Burns & MacEachern, p. 72-81.
29. Cameron, Christina, 2022, "World Heritage at 50: Looking Back, Looking Forward," *National Trust for Canada*, July 4, [https://nationaltrustcanada.ca/online-stories/world-heritage-at-50-looking-back-looking-forward], accessed October 1, 2022.
30. As heritage specialist and architectural historian Harold Kalman has noted, "Canada was a late arrival to the party" of modern built-heritage policies, which started in seventeenth-century Sweden. Kalman, Harold, 2021, "Hug a Tree, Hug a Building," *National Trust for Canada*, June 15, [https://nationaltrustcanada.ca/online-stories/hug-a-tree-hug-a-building], accessed October 1, 2022.
31. In June 2022, Steven Guilbeault, Liberal Minister of Environment and Climate Change, tabled Bill C-23, the Historic Places of Canada Act. Bill C-23 will add protection to National Historic Site status, which previously did not protect federally recognized sites from demolition. See National Trust for Canada, 2022, "Federal Heritage Legislation," [https://national-trustcanada.ca/what-you-can-do/advocacy-action/federal-heritage-legislation], accessed October 1, 2022. In March 2023, Bill C-23 was at second reading in the House of Commons. Open Parliament, 2023, "Bill C-23: Historic Places of Canada Act," [https://openparliament.ca/bills/44-1/C-23], accessed March 22, 2023. It is hard not to connect the weak heritage regulations of conservative provincial governments, like those of Alberta and Ontario, and their similarly problematic environmental policies; Wiebe, 2021. In an extreme example, the Ontario government recently passed legislation that assumes an adversarial relationship between heritage (both natural and built) and the housing crisis, explicitly linking destruction to prosperity and housing growth. Albertan cities and advocates for reuse are "hampered by the Alberta Historic Resources Act, which, unlike legislation in most other provinces, requires municipalities to compensate building owners for lost development value when it proceeds with heritage designation without the owner's consent. This controversial Act, while designed to protect the rights of property owners, has only created further barriers in cultivating positive attitudes towards heritage designation and innovative reuse."
32. According to conservation architect and urbanist Mark Thompson Brandt, most North American buildings date to the modernist period. Brandt, Mark Thompson, 2017, "Buildings and Stories: Mindset, Climate Change, and Mid-century Modern," *Journal of Architectural Conservation*, vol. 23, n° 1-2, p. 39, 43. As sustainable design instructor and writer Lloyd Alter has noted, "Ten years ago, we were often told an old building had to be demolished because it wasted too much energy and would cost too much to retrofit but would be replaced with a 'green' building that would be LEED certified"; Alter, Lloyd, 2022, "The Preservation of Existing Buildings is Climate Action," *TreeHugger*, 22 June, [https://www.treehugger.com/preserving-old-buildings-climate-action-5443126], accessed October 1, 2022.
33. Lindberg, James B., 2021, "Avoiding Carbon: Mitigating Climate Change Through Preservation and Reuse," In Erica Avrami, (ed.), *Preservation, Sustainability, and Equity*, Issues in Preservation Policy 3, New York, Columbia Books on Architecture and the City [https://www.arch.columbia.edu/books/reader/826-preservation-sustainability-and-equity#reader-anchor-4], accessed October 1, 2022.
34. O'Connor, Jennifer, 2020, "Save buildings, fight climate change," TEDxCAHP, October 22, [https://www.youtube.com/watch?v=PFdvlt41Hk], accessed October 1, 2022.
35. Vidaris Inc. and Syska Hennessy Group, 2016, "Assessing the Carbon-Saving Value of Retrofitting versus Demolition and New Construction at the United Nations Headquarters," December 6, [https://resources.vidaris.com/blog/assessing-the-carbon-saving-value-of-retrofitting-versus-demolition-and-new-construction-at-the-united-nations-headquarters], accessed February 28, 2023. The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on December 12, 2015. It entered into force on November 4, 2016. United Nations Climate Change, 2016, "The Paris Agreement," [https://unfccc.int/process-and-meetings/the-paris-agreement], accessed February 28, 2023.
36. The Paris Agreement is a legally binding international treaty on climate change, adopted at the UN Climate Change Conference (COP21) in Paris on December 12, 2015, which came into force on November 4, 2016. United Nations Climate Change, n.d., "The Paris Agreement," [https://unfccc.int/process-and-meetings/the-paris-agreement], accessed February 28, 2023.
37. On Lacaton & Vassal's "Never demolish," variously defined as vow, motto, mantra, or ethos, see Wainwright, Oliver, 2021, "'Sometimes the answer is to do nothing': unflashy French duo take architecture's top prize," *The Guardian*, March 16, [https://www.theguardian.com/artanddesign/2021/mar/16/lacaton-vassal-unflashy-french-architectures-pritzker-prize], accessed October 1, 2022; Berg, Nate, 2021, "Two French architects who 'never demolish' buildings just won the Pritzker Prize," *Fast Company*, March 16, [https://www.fastcompany.com/90615707/two-french-architects-who-never-demolish-just-won-the-pritzker-prize], accessed October 1, 2022; Novakovic, Stefan, 2021, "Never Demolish: Lacaton & Vassal Win Pritzker Architecture Prize," *Azure Magazine*, March 16, [https://www.azuremagazine.com/article/never-demolish-lacaton-vassal-win-pritzker-architecture-prize/], accessed October 1, 2022.

38. As Susan Ross writes, this loss not just of building materials, but also of human labour and geological history in the stone aggregate used in the concrete: "When a building like the [Public Safety Building] in Winnipeg is demolished, and the stones are 'lost' (in landfill, or recycling into unrecognizable stone pieces), we are also losing the human labour that created the smoothly finished surfaces that exposed the embedded geological history within each element." Ross, Susan, 2019, "'White elephant' in Winnipeg," *Waste Heritage Research: deconstruction, salvage & re-use*, October 28, [https://wasteheritageresearch.wordpress.com/2019/10/28/white-elephant/], accessed October 1, 2022.
39. Ross, Susan, 2021, "Learning to lose buildings," *Waste Heritage Research: deconstruction, salvage & re-use* January 6, [https://wasteheritageresearch.wordpress.com/2021/01/06/learning-to-lose-buildings/], accessed October 1, 2022.
40. National Trust for Canada, 2022, "Federal Heritage Legislation."
41. As Eberhard H. Zeidler wrote in his 1974 book about the MUMC project, *Healing the Hospital: McMaster Health Science Centre, its conception and evolution*, "this flexibility was the fifth dimension of architecture." Quoted in Strickland, Thomas, 2010, "McMaster University Health Sciences Centre," *The Canadian Encyclopedia*, January 18, [https://www.thecanadianencyclopedia.ca/en/article/mcmaster-university-health-sciences-centre], accessed October 21, 2022. The architect also emphasized flexibility in his address to the 17th International Hospital Congress in Dublin, excerpts from which were published as Zeidler, Eberhard H., 1971, "Plugging hospitals into the future," *The Globe and Mail*, June 23, p. 7.
42. Banham, Reyner, 1976, *Megastructure: Urban Futures of the Recent Past*, New York, Harper & Row, p. 224. quoted in Strickland, 2010.
43. Zeidler, Eberhard H., 2013, "McMaster University Health Sciences Centre (1967)," In *Buildings Cities Life: An Autobiography in Architecture*, Toronto, Dundurn Press, p. 113-129. The mention of "Psychedelic corridors" is quoted in Anonymous, 1971, "Just what the doctor ordered," *The Hamilton Spectator*, October 16, MUMC scrapbook, Local History & Archives, Hamilton Public Library, p. 35; Colour photographs appear in The Hamilton Spectator Collection, Local History & Archives, Hamilton Public Library, 1972, supplement, "The Great McMaster Medicine Show," May 23, MUMC scrapbook, p. 50 ff; The Hamilton Spectator, 1972, "Open house at Mac centre attracts 40,000 visitors," May 29, MUMC scrapbook, p. 58-64; Burman, Susan, 1978, "MUMC may be model for Dutch," *The Hamilton Spectator*, November 28, MUMC scrapbook, p. 161; Inglis, Grace, 1978, "Art inseparable from healing at McMaster Medical Centre," *The Hamilton Spectator*, August 11, MUMC scrapbook, p. 149-150a.
44. Annmarie Adams, quoted in McNeil, 2022.
45. Similarly, the McMaster Museum of Art architecture tour does not include Zeidler's MUMC. McMaster Museum of Art, 2023, "McMaster University Campus Tour," [https://izi.travel/en/f463-mcmaster-university-campus-architecture-tour/en], accessed March 22, 2023. The historic core of the main campus of McMaster University includes five Collegiate Gothic-style buildings that opened in 1930 (except for the Alumni Memorial Building, 1951). City of Hamilton, 2008, "By-law No. 08-002, To Designate Land Located at 1280 Main Street West (McMaster University), City of Hamilton, As Property of Cultural Heritage Value, January 9, [https://www.hamilton.ca/sites/default/files/2022-02/08-002.pdf], accessed November 30, 2022. Noting the original Dunington-Grubb landscaping, the designation defines the Historic Core as University Hall, Hamilton Hall, Wallingford Hall, Edwards Hall, and the Refectory, and the 1951 Alumni Memorial Building. Zeidler's medical building was built on the site of Dunington-Grubb's sunken garden, a loss recently re-emphasized in the *Hamilton Spectator* coverage of the 50th anniversary: McNeil, 2022.
46. Sheehan, Sarah, 2018, "Industrial Evolution," *Hamilton Magazine*, (Summer), p. 55.
47. Sheehan, 2018, p. 55. See also McCallum Sather, "Hamilton, Ontario, Health Science Library," [https://www.mccallum-sather.com/projects/health-sciences-library/] accessed August 31, 2022.
48. Hamilton's first Main Library (William Stewart, 1890) was Ontario's first purpose-built public library building, but was demolished in 1955 (see fig. 1); the second, Carnegie library (Alfred W. Peene, 1913), is reused by the provincial court system. Greenfield, J. Katharine, 1989, *Hamilton Public Library 1889-1963: A Celebration of Vision and Leadership*, Hamilton, Hamilton Public Library, 139 p. See Robinson, Danielle, 2007, "Modernizers and Traditionalists in Postwar Hamilton, Ontario: The Fate of a Farmers' Market, 1945-1965," *Urban History Review*, vol. 36, n° 1, (Fall), p. 45-59, and Rockwell, Margaret T., 2009, "The Facelift and the Wrecking Ball: Urban Renewal and Hamilton's King Street West, 1957-1971," *Urban History Review*, vol. 37, n° 2, (Spring), p. 53-61.
49. The city provides the following explanatory note: "Lloyd D. Jackson Square is a two-storey indoor shopping mall constructed in the heart of Downtown Hamilton in phases between 1970 and 1985. As a 1977 promotional brochure exclaims with the opening quote 'Growth is the only evidence of life' by Cardinal Newman, Lloyd D. Jackson Square marked a time in city development where large-scale redevelopment projects were seen as the way of the future to attract big business and people back to floundering downtowns. Many of these urban renewal schemes involved razing large swaths of land deemed dilapidated by urban planners, disrupting the existing built fabric and rejecting traditional city planning principles. Jackson Square was the centerpiece of one of the most ambitious of urban renewal projects in Canada, which involved the redevelopment of ten city blocks with construction phased over two decades, and the demolition of over one hundred 19th-century and early-20th century buildings." City of Hamilton ArcGIS online resource, [https://spatial-solutions.maps.arcgis.com/apps/webappviewer/index.html?id=ef361312714b4caa863016bba9e6e68f], accessed August 31, 2022. See also Anon., 2021, "Jackson Square was the first phase of a new vision for downtown Hamilton," *The Hamilton Spectator*, August 28, [https://www.thespec.com/life/local-history/spec175/2021/08/28/hamilton-jackson-square.html], accessed November 30, 2022.
50. Quigley, Michael, 1980, "New jacket for the city's books," *The Hamilton Spectator*, May 24, Central Library scrapbook, Local History & Archives, Hamilton Public Library, p. 23.

51. Quigley, p. 23. On Stelco Tower see Heinonen, Sara, 2023, "Stelco Tower: An Architectural Love Story," *Azure Magazine*, April 4, [<https://www.azuremagazine.com/article/stelco-tower-an-architectural-love-story/>], accessed April 8, 2023.
52. "Both the choice of oak as the predominant wood for the internal fixtures and the splendidly irregular staircase, in glass and white-painted tubular steel [...] contribute to this feeling [of lightness]. [...] The sort of bright, even garish, eye-shocking abstract designs which will be familiar to anyone who has visited McMaster Medical Centre are noticeable by their absence in the new library. Instead, the inside of the building is quiet, gentle and restful, the overall light grey of carpet and concrete pillars is broken only by the deep blue of the ceramic tiles which face the main column running up through the entire building." Quigley, p. 23.
53. The City of Hamilton designated Roscoe's City Hall in 2006.
54. The complex was listed on the municipal register as part of the Downtown Inventory by ERA Architects in 2014. City of Hamilton ArcGIS online resource (see note 49 for link).
55. In the view of architect David Premi, the detailing of the new façade of the additions assists in re-establishing "a connection with the street thereby supporting Downtown Renewal and the overall health of the urban environment," while former Chief Librarian Ken Roberts linked the renovation to a dramatic increase in user numbers: "Use of the building skyrocketed and has remained high ever since the transformation [...]" See DPAl, "Hamilton Public Library + Farmers Market," [<https://dpai.ca/2024/03/26/hamilton-public-library-farmers-market/>], accessed August 31, 2022. Chodikoff, Ian, 2011, "Street Smart," *Canadian Architect*, vol. 56, n° 10, (October), p. 18-23.
56. On Robarts, see Landrum, Lisa, 2019, "Campus Architecture: The Radical Medium of Learning," In Elsa Lam and Graham Livesey (eds.), *Canadian Modern Architecture: 1967 to the present*, New York, Princeton Architectural Press, p. 91-120. See also Lam, Elsa, 2019, "Toronto Architecture: Form and Reform," In Elsa Lam and Graham Livesey (eds.), *Canadian Modern Architecture: 1967 to the present*, New York, Princeton Architectural Press, p. 442: "massive concrete tower of book stacks has its counterpart in a delicate adjoining wing atrium, which puts rare books on display in a jewel box-like setting." See Friedland, Martin L., 2009, "Introduction," In Larry Wayne Richards, 2009, *University of Toronto: The Campus Guide*, New York, Princeton Architectural Press, p. 11-45.
57. Richards, 2009, p. 160-62.
58. Ashby, 2019, p. 22-23.
59. The Register listing was adopted by City Council on March 24 and 25, 1997. See City of Toronto, "Heritage Property Detail, 130 St. George St.," [<https://secure.toronto.ca/HeritagePreservation/details.do?folderRsn=2432389&propertyRsn=691960>], accessed October 21, 2022.
60. Richards, 2009, p. 85-87.
61. Exterior rehabilitation of the rare book library took place in 2017. Thaver, Emaan, 2017, "Rare Book Library encased in foam to prevent water damage," *The Varsity*, January 26, [<https://thevarsity.ca/2017/01/26/rare-book-library-encased-in-foam-to-protect-books-from-water-damage/>], accessed August 29, 2022. University of Toronto, 2013, "Boundless: Robarts Revitalization," May 28, [<https://issuu.com/boundless/docs/robarts>], accessed August 29, 2022. University of Toronto Libraries, "Robarts Common," [<https://onereach.library.utoronto.ca/robarts-common/home>], accessed August 29, 2022. Diamond Schmitt Architects also completed the renovations in 2017 of Fred Lebensold's National Arts Centre (1969), Ottawa.
62. Diamond Schmitt, "Robarts Common," [<https://dsai.ca/projects/robarts-common/>], accessed October 21, 2022. See also Mutrie, Eric, 2022, "Robarts Common Provides a Clear Contrast to Concrete Brutalism," *Azure Magazine*, April 29, [<https://www.azuremagazine.com/article/robarts-common-provides-a-clear-contrast-to-concrete-brutalism/>], accessed October 21, 2022.
63. Gee, Marcus, 2022, "A new chapter for University of Toronto's Brutalist behemoth Fort Book," *The Globe and Mail*, March 26, [<https://www.theglobeandmail.com/canada/toronto/article-university-toronto-fort-book-robarts-library/>], accessed October 21, 2022.
64. The Grand Théâtre is also on the provincial *répertoire* of built-heritage sites: Culture et Communications Québec, Répertoire du patrimoine culturel du Québec, "Grand Théâtre de Québec," [<https://www.patrimoine-culturel.gouv.qc.ca/rpcq/detail.do?methode=consulter&id=170255&type=bien>], accessed October 21, 2022. Other brutalist cultural centres that were built as Centennial projects include the Confederation Centre of the Arts, Charlottetown, PEI; the National Arts Centre, Ottawa; and the Royal Manitoba Theatre Centre, Winnipeg. The pre-renovation Grand Théâtre de Québec is included in Phaidon's *Atlas of Brutalist Architecture* (see fig. 17). McLeod and Churly, 2018, p. 22. See also Canadian Architect, 2015, "RAIC Awards – Prix du XXe siècle: Fathers of Confederation Buildings Trust," *Canadian Architect* vol. 60, n° 5 (May), p. 45.
65. Canadian Architect, 2017, "Lemay and Atelier 21 design protective shell for Grand Théâtre de Québec," *Canadian Architect* online, April 27, [<https://www.canadianarchitect.com/lemay-atelier-21-grand-theatre/>], accessed October 21, 2022; Canadian Architect, 2021, "Grand Théâtre de Québec," *Canadian Architect* vol. 66, n° 3, (May), p. 44-46. As Susan Ross notes, a similar intervention took place at Place Bonaventure, Montreal, (Affleck Desbarats, Dimakopoulos, Lebensold, Sise, 1967) where concrete panels were 'skinned' with a glass curtain wall in 1998. Ross, Susan, 2019, "An ontology of reuse from Montreal," *Waste Heritage Research*, January 14, [<https://wasteheritageresearch.wordpress.com/2019/01/14/draft-an-ontology-of-reuse-from-montreal/>], accessed October 21, 2022.

66. Venne, Jean-François, 2021, "Le Grand Théâtre de Québec : le brutalisme paré de verre," *Esquisses*, vol. 32, n° 2, (Summer) p. 24. Lemay, 2021, "Grand Théâtre de Québec wins Royal Architectural Institute of Canada Innovation Award," April 27, [<https://lemay.com/grand-theatre-de-quebec-wins-royal-architectural-institute-of-canada-innovation-award/12017/>], accessed October 21, 2022. For the building's history see Grand Théâtre Québec, "Notre Histoire," [<https://grandtheatre.qc.ca/a-propos/notre-histoire/>], accessed October 21, 2022. See Jolicoeur, Louis, and André Morency, (eds.), 2022, *Le Grand Théâtre de Québec: l'histoire vivante d'une scène d'exception*, Québec, Septentrion, 396 p. Lemay, 2020, "Grand théâtre de Québec preservation solution," [<https://lemay.com/projects/grand-theatre-de-quebec/>], accessed October 21, 2022.
67. Canadian Architect, 2017.
68. E.g. the Vancouver Planetarium (George Norris, 1967) and the Centennial Museum of Science and Technology / Ontario Science Centre, Toronto (Moriyama & Teshima, 1969). Polo, Marco and Colin Ripley, 2019, "The Centennial Projects: Building the New," In Lam, Elsa and Graham Livesey, (eds.), *Canadian Modern Architecture: 1967 to the Present*, New York, Princeton Architectural Press, p. 19-52, p. 40; Ede, 1971, p. 82-93.
69. CBC Calgary, 2013, "Former planetarium eyed as arts space," April 5, [<https://www.cbc.ca/news/canada/calgary/former-planetarium-eyed-as-arts-space-1.1365032>], accessed August 31, 2022. CBC Calgary, 2014, "Old planetarium possible site for art gallery, city agrees," March 7, [<https://www.cbc.ca/news/canada/calgary/old-planetarium-possible-site-for-art-gallery-city-agrees-1.2564167>], accessed August 31, 2022.
70. Media release quoted in Lederman, Marsha, 2019, "Calgary is one step closer to getting a gallery for modern and contemporary art," *The Globe and Mail*, January 14, [<https://www.theglobeandmail.com/canada/alberta/article-calgary-is-one-step-closer-to-getting-a-gallery-for-modern-and/>], accessed August 31, 2022. See KPMB, "Contemporary Calgary," [<https://www.kpmb.com/project/contemporary-calgary/>], accessed August 31, 2022. See also City of Calgary, "Centennial Planetarium Renovations," [<https://www.calgary.ca/csps/recreation/research-and-development/centennial-planetarium-renovations.html>], accessed August 31, 2022.
71. Although the CBC reported that the planetarium is protected, neither the City of Calgary nor Heritage Calgary websites note any level of protection. Designated buildings in the province are protected as "Municipal Historic Resources" under the Alberta Historical Resources Act. See City of Calgary, "Inventory of Evaluated Historic Resources, Centennial Planetarium," [<https://www.calgary.ca/arts-culture/heritage-sites/scripts/historic-sites.html?dhcResourceId=247>], accessed August 31, 2022. See also Heritage Calgary, "Inventory of Evaluated Historic Resources," [<https://www.heritagecalgary.ca/explore-inventory>], accessed August 31, 2022. Similar to the current nomination process for National Historic Sites, heritage designation of buildings in Alberta hinges on the consent of the property owner. Heritage Calgary, "Designation," [<https://www.heritagecalgary.ca/designation>], accessed August 31, 2022.
72. See note 2.