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The suburban slab: Retrofitting our concrete legacy for a sustainable future

The 1960s-vintage, concrete slab-style high-rise apartment building should be Toronto's mascot; for better or worse, it's the distinguishing feature of our region. It is a product of the postwar boom and the resulting population explosion, and we have more of them than any other city on the continent. Why, then, do we have such a contentious relationship with these structures? After all, they have the potential to be our greenest buildings and to bring sustainability to the suburbs. We need to learn to love them.

Our slabs are everywhere, particularly in the inner suburbs: they're next to strip malls, ravine edges, tracts of bungalows and wide arterials. Although they're now familiar neighbourhood landmarks, it's remarkable that they exist at all. They are the legacy of a unique planning history that was highly influenced by Western Europe. The Toronto area is the only North American region that included high-density suburban growth in its postwar urban planning. While most cities sprawled at the edges, Toronto's change from fields of pasture to fields of towers can only be described as heroic by comparison.

The surprising result is that the Toronto region contains the second-highest number of high-rise buildings (over twelve storeys) in North America: more than 2,000. First place, of course, goes to New York, with over 5,000. Yet, after this, the numbers drop steadily: third place is Chicago with just over 1,000, then Vancouver with some 600, followed by the sprawling Miami region's 500.

A skyline of concrete apartment high-rises is not the postcard image of leafy Victorian Toronto [1]. Yet these towers have considerable benefits. As architect Buckminster Fuller noted on a 1968 visit to our fair city, 'In Toronto, an unusually large number of high-rise apartments poke above the flat landscape many miles from downtown. ... This is a type of

high-density suburban development far more progressive and able to deal with the future than the endless sprawl of the U.S."[1] This observation remains true today. Further, with a little imagination, our aging modernist apartment buildings could be the key to greening the city and transforming the region.

The sexy slab and boomtown Toronto

When originally built, these buildings were the peak of urban chic. High-rise apartments symbolized a new world and a nation confident after the war. Seen as the best solution for mass housing, they were designed to contain floods of new inhabitants within the borders of the newly formed Metropolitan Toronto. They also represented a highly profitable real-estate venture, which helped to further fuel the already-booming economy.

Our current condo mania seems big, but it's nothing compared to the postwar apartment boom: nearly 200,000 units were built in towers throughout the city in the sixties and seventies – 30,000 units in 1968 alone. Toronto was thinking big and growing fast. Residents embraced this mode of living in a smaller space – along with Scandinavian furniture, underground parking, indoor pools and panoramic views of the growing city. Toronto quickly shook off its pre-war fear of 'multiple' housing and plotted a bold course to the future.

The modern Toronto high-rise first appeared downtown, with the City Park Apartment complex north of Maple Leaf Gardens, completed in 1954, only two years after Le Corbusier's seminal Unité d'Habitation in Marseille. Yet it was in the

1 (ABOVE) Landmarks in Toronto's modern suburbs: Jane-Exbury Towers, Jane Street and Highway 401.

1 Fuller Geometric, Architects, Engineers, Planners, *Project Toronto, A Study Proposal for the Future Development and Design of Toronto* (Cambridge MA, 1968).

suburbs where these modern towers had the greatest influence. Beginning with the English- and Swedish-inspired apartment communities of Flemingdon Park and Thorncliffe Park of the late 1950s, modern high-rises quickly became synonymous with suburban growth [2].

Toronto's use of the concrete high-rise in expanding suburban regions was truly 'smart growth' before the term was coined. The result created

2 Toronto's modern high-rise apartments, natural systems and transit system, existing and proposed, converge to identify potential areas for tower renewal across the city and suburbs.

high-density clusters distributed throughout the region, some as far as 25 kilometres from downtown [3]. Fewer than 20 percent of renters reside downtown; the majority call the suburban tower home. Without the density these high-rises create, transit would not work in the suburbs, and the region would be significantly more sprawling. Like many aspects of Toronto in the 1960s, our suburbs were remarkably progressive. But there's

3 High-rise apartments adjacent to Humber River in the city's north end.

a catch: the high-rises are also, in their present state, the most ecologically irresponsible housing type in the city.

Waste and neglect: the aging, leaky slab

Today, as many of them approach their fortieth birthday, the lustre of these aging towers is gone, and they are leaky energy pigs. Although density is generally thought to aid sustainability, our stock of slab apartments demands more energy per square metre than any other housing type – current data suggests up to 20 percent more than a contemporary single detached house. Though certain efficiencies are gained from reduced land coverage, transit use and the like, the buildings themselves perform poorly.

The towers were built in an era of cheap energy, when 'conservation' was not yet in the lexicon. Their exposed slab edges (seen on walls and protruding balconies), minimal insulation, single-glazed windows and aging mechanical systems mean that these buildings make an enormous environmental impact: together, they are estimated to represent some 20 percent of Toronto's total residential carbon emissions. A typical 200-unit building is responsible for approximately 1,000 tonnes of greenhouse gases per year.

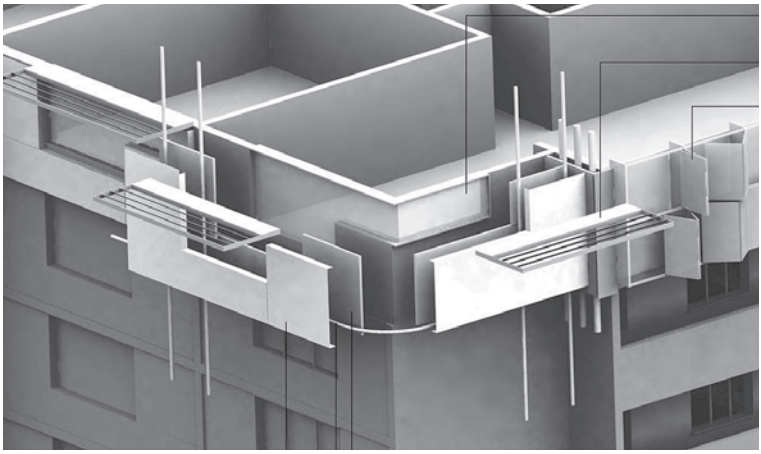
Beyond the thermal inefficiencies, these buildings are simply not working as they should. Many find themselves at the bottom of the housing market and not maintaining a basic 'state of good repair.' They're years overdue for significant upgrade and repair, and their aging sealants, windows and mechanical systems are well past their best-before date. Poor planning and neglect have left the 'park' space of the worst of these buildings as fenced-in wastelands; some even showcase abandoned swimming pools and clusters of disorganized dumpsters rather than the communal green space that was envisioned. Toronto built the 'towers in the park' with gusto, but we never really learned how to use them effectively. Today they are generally believed to be an idea that might have best been left on the drawing board.

Critical mass, modern heritage and the sustainable slab

Time to get out the wrecking ball? Far from it. If ever there was a candidate for reinvestment, the concrete tower in the park would be it. In a culture of sustainability, demolition is a simple waste of new resources and of the embedded energy already expended in the original construction. Due to their relatively straightforward construction, boxy facades, sound concrete structure and ample open space, these slabs offer the perfect infrastructure for green retrofit at a fraction of the cost of building anew. Managing our resources for sustainability includes respecting our built heritage, and we could not have asked for a better inheritance.

The primary problem with these buildings is the lack of a 'thermal break' between interior and exterior environments, essentially making these buildings into sieves. The masonry walls of these older slabs offer an ideal surface to support 'over-cladding': new insulation, rain screen and exterior 'skin' affixed to the face of the existing building. This approach extensively insulates the exterior of the buildings and covers leaky slab edges. As well, new sun shading over windows, especially south-facing ones, and the provision of balcony enclosures (a light double skin, which can open in the warm months and provide a usable space in the winter), would significantly reduce the energy required to heat and cool the building [4]. Research conducted by Dr. Ted Kesik and Ivan Saleff at the University of Toronto suggests that these techniques alone are predicted to cut energy demand in half. They would also provide opportunities to reimagine the appearance of these buildings, offering the potential for unique and attractive neighbourhood landmarks.

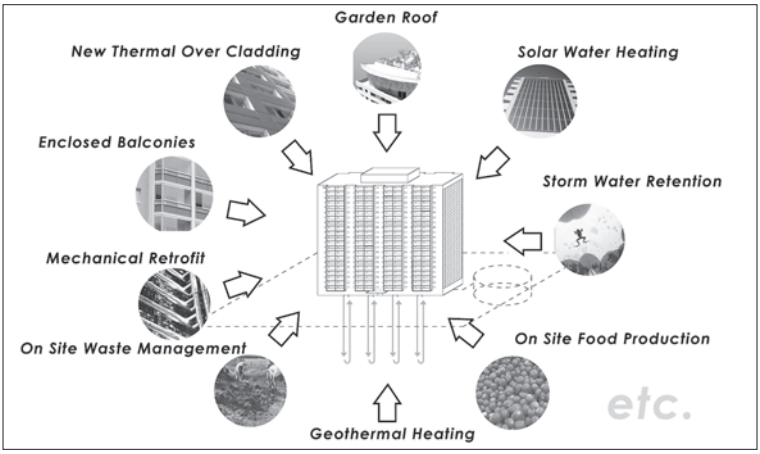
The sheer scale of the buildings provides the critical mass that makes the installation of renewal-energy technologies viable. Some options include geothermal heating and cooling, solar hot-water heating (from panels on



4 Conceptual framework for over-cladding strategy, developed by Graeme Stewart in collaboration with Ted Kesik, Ivan Saleff and George Baird.

generous blank end walls), green roof technology (rooftop gardens that help insulate, retain water, cool the building and serve as amenity) and, of course, electric wind turbines. Applied at a district level, large installations of these techniques could make clusters of concrete high-rises completely self-sustaining, taking them off the city's aging and overburdened grid, and any surplus energy could be shared with neighbouring buildings. These strategies would give the opportunity for carbon reductions of more than two-thirds of the current output. In other words, a 200-unit apartment building would produce lower greenhouse-gas emissions than fifty traditional bungalows. Suddenly, density begins to make sense.

These aging buildings offer endless other opportunities for green modification [5]. All of the above upgrades could be installed without tenant displacement, instead taking the form of phased upgrades from the outside in. The concrete structure of these buildings also offers the possibility for more radical alterations and building repurposing; for instance, because they have the structural capacity to handle the addition of new floors, the buildings themselves could be a launching pad for (appropriate) intensification. Units separated by shear walls spaced at 6 metres could be joined both vertically and horizontally, creating genuinely family-sized units. Furthermore, by design, the concrete walls create the necessary fire separations to allow for a mix of uses: anything from at-grade retail and office conversion to light industry. Because they're expected to remain standing for several more generations and because of their embedded flexibility, these concrete structures can do more than we've ever considered.



5 Potential green modifications to existing high-rises and their properties.

Far less daunting than squeezing efficiencies out of 200,000 bungalows, retrofitting these aging high-rises is an alternative that could significantly help to achieve Toronto's environmental goals. These sixties slabs represent an incredibly sound resource worthy of reinvestment.

Open space: using our inherited land resource

Building upgrades have the potential to significantly improve building efficiency, but the real opportunities exist beyond the buildings themselves. They sit amid hectares of underutilized land largely relegated to surface parking and is for the most part currently surrounded by chain-link fence. Many of these areas – north Etobicoke's Kipling and Steeles, for instance – contain roughly the same population as the Annex (some 13,000 residents) and, surprisingly, at over twice the density. Yet they lack the high street, the services, the shops or any venue that could be considered active or public.

This is the dilemma faced by most residents of these suburban high-density buildings: they have to drive or wait for the bus for any simple errands or social contact. Clustering growth in new green communities around these existing buildings would help bring routine commercial and social amenities to these sites, making true destinations out of these single-use dormitories. Unfortunately, other uses are generally not permitted by the city's current regulations. Is it time to bring 1960s zoning into the twenty-first century?

6 Existing site plan of Kipling and Steeles in North Etobicoke. Nineteen towers house over thirteen thousand people – enough to be considered a 'city' if it were outside of Toronto's borders. Yet the area suffers from a lack of basic commercial and social amenities. Chainlink fences block access from one generous property to another, as well as to the adjacent ravine. This is typical of areas throughout Toronto.

Creating new housing types, commerce and public spaces would help alleviate the placelessness for which these buildings are often criticized. Moreover, allowing new development will offer a financing mechanism for the retrofitting and aid in providing the social and community amenities desperately needed in many of these districts. It would significantly reduce auto trips for apartment dwellers and the surrounding community. It would help enable entrepreneurship and local participation, allowing these communities to mature into the lively, active and diverse neighbourhoods for which our city is celebrated [6, 7].

Beyond being simply mixed use, these areas could develop into genuinely permacultural communities, taking advantage of the potential for urban agriculture, on-site waste management and the aforementioned district renewable-energy installations. Community gardens could be

7 Creating public connections to activate this enormous land resource, allowing for markets, new retail, housing and amenities responding to the dense and diverse community, could transform this underutilized area into a thriving neighbourhood. Retrofitted buildings, district energy and bringing mixed use to existing density could also result in one Toronto's 'greenest' communities. We only need to let it happen.

paired with farmers markets, street vendors and bazaars. Greening could be paired with intensification and community development, creating integrated mixed use and self-sustaining communities throughout the Toronto region [2].

Greening these towers is more than simply retrofits and energy counts; it is investing in and fostering sustainable communities.

Learning from Europe

Is this wishful thinking? Quite the opposite. Globally, the community-building and carbon-cutting potential of these aging towers has been realized, most notably in the EU. Since Europe was highly influential in our adoption of the towers, it seems fitting that the key to their continued relevance should also come from across the pond.

In both Eastern and Western Europe, aging welfare-state and Soviet-era towers have been exploited for their energy-saving potential to help achieve increasingly strict EU environmental policies. In my own tours of European high-rise districts over the past several years, the abundant examples of regeneration, greening, intensification and retrofitting were truly eye-opening. At my meetings with architects, politicians, planners and residents throughout Europe, I saw that these buildings were viewed as important urban assets rather than as liabilities, and so integrated

strategies have been developed to renew both publicly and privately owned sites. It quickly became clear that Toronto has a huge opportunity, and that we are currently behind in what has become a global initiative.

One example is Bratislava, Slovakia. Here, the entire Petržalka, a district south of the Danube River with hundreds of blocks built in the 1970s, is undergoing extensive environmental upgrades to meet new EU standards. Paid for in equal shares by the European Commission on the Environment, the municipality and private investors (who gain development rights on adjacent properties), the project is breathing new life into this aging district.

While too often these tower upgrades utilize aesthetically questionable re-clads, many are elegant, and a handful are remarkably comprehensive urban-investment projects worthy of emulation. These aging tower districts were completely reimagined through new infill development, public space and landscape upgrades. They have become popular neighbourhoods for young families; they include cultural facilities, markets and, in the case of central London, even successful urban agriculture. Of particular note are the Bijlmermeer (Amsterdam), Marzahn (Berlin) and Teply Stan (Moscow).

Toronto's similarity to European urban structure, with its prevalence of suburban high-rises, positions it uniquely within North America to yield substantial environmental and community benefits from a comprehensive tower-renewal strategy, creating a positive legacy for what is undoubtedly an invaluable housing resource throughout the GTA and Southern Ontario. The sustainability wish list outlined in the previous section has been tested and actualized, in some cases with remarkable success. We are in a wonderful position to learn from the most successful and innovative of these foreign examples and to adapt them to a Canadian context. Along the way we will undoubtedly innovate solutions of our own, but simply identifying the possibility is the first step. We are sitting on a huge opportunity.

Real action: the Tower Renewal Project and the future of Toronto

The similarities of Toronto's urban structure to the European experience goes beyond the superficial coincidence of peripheral high-rise apartments. A flood of new research by Dr. David Hulchanski, Adrian Blackwell and others argues that aspects of our economic and social geography are becoming 'Europeanized.' With an increasingly wealthy centre and increasingly marginalized 'inner suburbs,' with poverty predominantly located in our aging high-rises, we are sadly becoming a city of rich and

poor. If we're not careful, in twenty years we may become Paris – not the Paris of the Left Bank but the Paris of 2006's eye-opening riots.

We don't need to let this happen. Now aware of the connection between these energy-inefficient high-rises, poverty and the city's thirteen identified 'neighbourhoods socially at risk,' the Mayor's Office of the City of Toronto has implemented the Tower Renewal Project. This is a building-upgrade, community-reinvestment and greening-incentives program that aims to significantly improve the social, economic and environmental sustainability of the region.

This project is in its formative stages; it's being designed to grow into an ongoing multi-partnered, multidisciplinary research and implementation effort, which will enable communities and stakeholders to benefit from these remarkable greening and urban investment opportunities. Reduced energy use, renewed building stock, better quality and affordable housing, healthy, diverse and well-connected neighbourhoods and managing growth are all key to the mayor's agenda, and tower renewal offers possibilities for all these priorities.

The tower renewal concept is more than retrofits and energy counts: it is investment in and fostering of sustainable communities. The mixture of high-density and unused open space creates limitless possibilities. We have the opportunity to turn apartment clusters into green apartment villages. It is an opportunity awaiting actualization. We need to think creatively and allow it to happen. As John Barber wrote in the *Globe and Mail* after the Tower Renewal Project's launch: 'One thoughtful initiative can change the direction of an entire city. As the mayor has recognized, this is one of them. After years of neglect, the suburban slabs are now the prime focus of Toronto's quest for both sustainability and social justice.'

A growing list of partners currently includes the City of Toronto, ERA Architects, the Clinton Foundation, the University of Toronto, the Toronto Atmospheric Fund, Toronto Community Housing and the Canadian Mortgage and Housing Corporation. Such a project poses many obstacles and challenges, but through the spirit of co-operation and innovation, the challenges of creating a sustainable city can be met.

Buildings go through cycles, or at least our relationship with them does. The idea of the concrete tower as urban saviour sounds laughable in a city that has spent much of its time actively disliking them. Yet, to reiterate Buckminster Fuller's musing of some forty years ago, these towers in the park laid the groundwork for a progressive and well-planned city. At long last, these aspirations may bear fruit. Our grey towers hold the key to a green and vibrant future.