Tower Neighbourhood Renewal in the Greater Golden Horseshoe

An Analysis of High-Rise Apartment Tower Neighbourhoods Developed in the Post-War Boom (1945-1984)

Prepared by
E.R.A. Architects,
planningAlliance, and the
Cities Centre at the University of Toronto

for the
Ontario Growth Secretariat
Ministry of Infrastructure

November 2010
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Project Team
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Executive Summary
Executive Summary

The Greater Golden Horseshoe’s (GGH’s) pattern of urbanization is unique in North America, with nearly 2,000 post-war apartment towers located throughout the region.

The Greater Golden Horseshoe’s (GGH’s) pattern of urbanization is unique in North America. A major contributing factor to this urban form is the significant development of high-rise modern apartment housing that occurred in the post-war period, roughly between 1945 and 1984, though concentrated between 1960 and 1980. There are nearly 2,000 post-war Apartment Towers located throughout the region as a result of post-war planning policies that encouraged the “tower-in-the-park” housing model and higher density apartment clusters in new suburban communities.

Though unique in North America, the region’s decentralized clusters of modern towers share similarities with post-war housing developments found the world over, with particular concentrations in Europe, the former Soviet Union, and parts of Asia. In many of these locations, the revitalization of aging tower clusters and their neighbourhoods has been recognized as a key strategy for achieving contemporary urban planning goals of low-carbon, prosperous, and equitable communities. With the European Union showing particular leadership in this field, post-war Apartment Tower Neighbourhoods have emerged as model low-carbon communities and centres of social and economic development, through targeted green refurbishment and integrated processes of neighbourhood renewal. Throughout this report, this process will be defined as Tower Neighbourhood Renewal, and residential buildings that are eight storeys and above, constructed between 1945 and 1984, will be referred to as Apartment Towers.

The Province of Ontario has established a policy framework to foster regional sustainability and prosperity, through the development of initiatives such as the Greenbelt, the Growth Plan for the Greater Golden Horseshoe, The Big Move – Metrolinx Regional Transportation Plan, the Poverty Reduction Strategy, and the Go Green Action Plan on Climate Change, among others. The GGH’s prevalence of post-war Apartment Towers makes it uniquely suited in North America to benefit from engaging in Tower Neighbourhood Renewal strategies as a compliment to these initiatives.

The focus of this study is two-fold. The first objective is to analyze and catalogue this housing resource to better understand its current role within the GGH. The second objective is to examine the potential for Tower Neighbourhood Renewal to support the realization of provincial priorities, such as implementing the Growth Plan for the Greater Golden Horseshoe, creating a network of regional rapid transit, conserving energy, reducing greenhouse gas (GHG) production, reducing poverty, providing affordable housing, and building a green economy.

Tower Neighbourhood Renewal

In this report, the opportunities related to achieving complete and sustainable communities within Apartment Tower clusters will be referred to as Tower Neighbourhood Renewal. Described as Tower Renewal in previous documents, Tower Neighbourhood Renewal makes explicit the holistic set of strategies related to the renewal, retrofit, and regeneration of Apartment Clusters, and their intersection with the complete communities mandate of the Growth Plan, prosperity and sustainability mandates of provincial policy, as well as comprehensive sustainable planning in general.
Findings Related to Current State of Apartment Towers:

Key findings of this study related to the current state of these Apartment Towers and their neighbourhoods include the following:

- Apartment Towers are a major component of the GGH’s housing stock. There are 1,925 Apartment Towers in the GGH. Collectively these towers are home to approximately one million people.

- Apartment Towers represent one-third of the GGH’s rental housing stock, and 48 per cent of the City of Toronto’s rental stock.

- Apartment Towers are among the highest energy users of all housing types in the region, requiring as much as 25 per cent more energy per square metre compared to a single detached house. Similarly, they typically have low waste diversion rates of less than 12 per cent.

- Apartment Towers are very closely linked to areas of social need. Seventy-seven per cent of all Apartment Towers in the GGH are found in Census Dissemination Areas considered to have high or very high social need, while only 12 per cent of towers are found in areas considered to have low or very low social need.

- Apartment Towers can be found throughout the GGH. The majority (62 per cent) are found in Toronto, with 29 per cent found in the GTHA without Toronto and nine per cent found in the municipalities that make up the Outer Ring of the GGH (see diagram of region on this page). Over two-thirds of upper- and single-tier municipalities in the GGH have Apartment Towers as part of their housing mix.

- Apartment Towers in the GGH are generally found in clusters. In the GGH, 89 per cent of all Apartment Towers are found in clusters of two or more, and 62 per cent are found in large clusters of five or more. The largest of these Apartment Tower clusters contain more than 10,000 households.

- Apartment Towers are generally situated on large land parcels of 1 hectare or more. This is a legacy of open space ratios that were encouraged to achieve the “tower-in-the-park” configuration, with 80 to 90 per cent of the site area left as open space. The total land resource in the GGH on which Apartment Towers are situated is 2,198 hectares. More than half of apartment properties are directly adjacent to another apartment property, creating clusters of adjoined open space.

- Residents of Apartment Towers tend to rely more on transit, walking and cycling to get around than other residents of the region. Sixty-two per cent of Apartment Towers are within areas with higher than average public transit use for their respective municipalities. Fifty-eight per cent of Apartment Towers are in zones with higher than average rates of walking and cycling. Seventy per cent are located in zones with lower than average car ownership rates.
Apartment Towers in the Greater Golden Horseshoe
1945-1984, Eight Storeys and Above

Selected Findings:

Location of GGH’s 1,925 Apartment Towers

<table>
<thead>
<tr>
<th>Location</th>
<th>Apartments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Golden Horseshoe</td>
<td>91%</td>
</tr>
<tr>
<td>Outside Greater Golden Horseshoe</td>
<td>62%</td>
</tr>
<tr>
<td>Outside Toronto</td>
<td>29%</td>
</tr>
<tr>
<td>Toronto</td>
<td>9%</td>
</tr>
</tbody>
</table>

Percentage of Apartment Towers Grouped in Clusters Within 150m of One Another

- Cluster of 2-4 towers: 11%
- Cluster of 5 or more towers: 62%

Apartment Towers and Social Need

- Very Low Social Need: 0.6%
- Low Social Need: 11%
- Moderate Social Need: 12%
- High Social Need: 33%
- Very High Social Need: 43%

Total Towers in GGH: 1,925*

* Number of Towers with data available for query

Legend

- Apartment Towers (not to scale)
- Delineated Built up areas
- Greater Golden Horseshoe (GGH)
- Greater Toronto and Hamilton Area (GTHA)
- Boundary of upper and single-tier municipalities
- Outer Ring of the GGH
- GTHA without Toronto
- Toronto

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.
Tower Neighbourhood Renewal and Provincial Policy Objectives:

The Renewal of Apartment Tower Neighbourhoods provides a significant opportunity to support the livability and sustainability goals of Provincial policy. Found in large clusters throughout the region, tower neighbourhoods provide a large geography for action. The following is a breakdown of key Tower Neighbourhood Renewal opportunities, and how they relate to key areas of Provincial interest.

The Big Move - Metrolinx Regional Transportation Plan:

Given the already strong tendencies of Apartment Tower residents to use transit, and their relative dependence on transit due to lower than average car ownership rates, Apartment Tower Neighbourhoods have significant potential to function as the ridership anchors that will enhance the effectiveness of the Regional Transportation Plan (RTP) transit network. Currently, only 17 per cent of Apartment Towers are within walking distance (approximately 500 metres) to regional rapid transit. The RTP’s 25-year regional rapid transit network would significantly improve this situation, providing direct access to nearly 64 per cent of towers. As detailed planning proceeds for the RTP transit network, an understanding of Apartment Towers can help to guide decisions on routing and station location. Knowledge of Apartment Tower Neighbourhoods and their needs and opportunities can also inform the Transportation Master Plans and Active Transportation Master Plans that the RTP suggests be undertaken by municipalities, as well as the Transit Supportive Land Use Planning Guidelines being developed by the Ministry of Transportation. Local transit, pedestrian, and cycling infrastructure strategies as they relate to apartment clusters could also be considered.

Poverty Reduction Strategy:

With high concentrations of New Canadians as well as youth in areas of high social need, there is significant potential to integrate the renewal of these neighbourhoods with Ontario’s Poverty Reduction Strategy programs such as the expansion of Parenting and Family Literacy Centres, Ontario Early Years Centres and After School Programs, the Community Use of Schools Program and Community Hub Program, and the Newcomer Settlement Program. Renewal can also contribute to affordable housing supply and bring new employment and social enterprising opportunities to what are currently isolated neighbourhoods.

Go Green Action Plan on Climate Change:

Tower Neighbourhood Renewal has the potential to be a key component of Ontario’s climate change strategy, and contribute to the greenhouse gas (GHG) reduction targets of Go Green: Ontario’s Action Plan on Climate Change. Apartment Towers are among the most energy wasteful housing types, and collectively are responsible for upwards of two megatonnes of GHGs on an annual basis for building operation alone. However, Apartment Towers are well suited for refurbishment, and in other jurisdictions they have been upgraded to become model green buildings, with GHG output reduced by more than 50 per cent. The dense clusters of Apartment Towers that are common throughout the GGH also provide opportunities for using distributed clean energy and district heating and cooling systems, as well as alternative waste management systems.
Growth Plan for the Greater Golden Horseshoe:
Tower Neighbourhood Renewal can support the creation of complete communities as envisaged by the Growth Plan for the Greater Golden Horseshoe. These buildings often sit on large, underused parcels of land, and are frequently located in parts of municipalities that have high potential for intensification. Fourteen per cent of Apartment Towers are located within urban growth centres and 55 per cent are located near (within 250 metres) to arterial roads. Mixed-use intensification of these sites can contribute to the complete community goals of the Growth Plan, as Apartment Towers are often isolated, with relatively poor access to key community services, employment, cultural facilities and shopping areas. Intensification provides an opportunity to introduce these types of amenities, particularly in areas identified for future regional rapid transit. Undertaken with thoughtful urban design, the currently fragmented and isolated apartment clusters can become integrated, connected and complete communities.

Challenges:
The greatest potential for Tower Neighbourhood Renewal rests in coordinated action among a number of players to address large clusters of Apartment Towers, related to the areas of policy interest discussed above. Taking advantage of these opportunities will require an integrated approach to address a number of challenges.

The GGH is unique internationally by the degree to which post-war Apartment Towers are privately owned and operated - for example, approximately 85 per cent of buildings in Toronto are in private ownership. Furthermore, ownership is fragmented, with large clusters found throughout the region typically divided among multiple owners. In Europe, renewal was often the result of initiatives undertaken by public housing companies, or large private owners, responsible for large estates. Achieving Tower Neighbourhood Renewal in the GGH will require the establishment of an investment framework attractive to market interests, as well as a means by which multiple owners can effectively coordinate renewal efforts.

A related challenge is the high degree of social need associated with the housing stock, paired with private ownership. With this pairing, the needs of at risk residents are often not met, with programs related to newcomers, youth, families, education, training, and access to daily conveniences generally beyond the scope of private owners. Addressing these acute challenges will require partnerships with public service providers, non-profit agencies and community development corporations as part of an affective process of renewal.

Financing Refurbishment:
One of the major challenges is financing physical renewal. The cost of green refurbishment of Apartment Towers is in the range of $25,000 - $45,000 per unit. In Europe, governments have facilitated renewal through low interest loans, loan securities and gap financing. In addition, the development of surplus land has been used to create revenue streams for renewal. The financing of renewal projects in Ontario will require a variety of approaches that target a wide range
**Executive Summary**

Tower Neighbourhood Renewal in the Greater Golden Horseshoe

**Greater Golden Horseshoe**

Apartment Towers and Provincial Policy

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**Legend**

- **Apartment Towers (not to scale)**
- **Existing and Planned Regional Rapid Transit**
- **Urban Growth Centre**
- **Delineated Built up areas**
- **Designated Greenbelt Area**
- **Greater Golden Horseshoe (GGH)**
- **Greater Toronto and Hamilton Area (GTHA)**
- **Toronto**
- **Boundary of upper and single-tier municipalities**

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network". Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (RBC).

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*50km*
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Greater Toronto and Hamilton Area
Apartment Towers and Provincial Policy

Legend
- Apartment Towers (not to scale)
- Existing and Planned Regional Rapid Transit*
- Urban Growth Centre
- Delineated Built up areas
- Designated Greenbelt Area
- Greater Toronto and Hamilton Area (GTHA)
- Boundary of upper and single-tier municipalities

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team's interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network".

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
of owner groups. Strategies may include combinations of private lenders, utilities, pension funds and other investment funds; generating revenue streams from intensification; as well as governments guaranteeing long term loans of private lenders, providing gap financing and low-interest loans, and supporting public housing. In July 2010, the City of Toronto Council endorsed the creation of a Tower Renewal Corporation with the mandate to assist owners in financing Tower Renewal projects. The details of the program are still under development.

Planning policy framework:
The current land use planning policy framework presents challenges for achieving Tower Neighbourhood Renewal, with clusters of Apartment Towers often existing within restrictive ‘single-use’ zoning allowances. A supportive land use planning policy framework would need to address coordination of planning across multiple Apartment Tower properties; design guidelines for infill development; green standards for new construction within Apartment Tower Neighbourhoods; infrastructure needs and capacities; community consultation processes that shape renewal outcomes, and the long term management of Apartment Tower sites following renewal.

Ensuring equity:
Another challenge is maintaining housing equity and affordability in the face of Tower Neighbourhood Renewal. This will require methods for ensuring affordability post-renewal, minimizing tenant discomfort during the renewal process, and ensuring that displacement does not occur as a result of renewal. Addressing these challenges may include agreements with owners for rent freezes in exchange for density bonusing and renewal financing, as well as facilitating partnerships with affordable and public housing providers.

Conclusion:
For the past few years, the Government of Ontario has been pursuing a number of policy initiatives that, collectively, are intended to revitalize and improve the sustainability and livability of communities across the province. There are few locations in the province that could benefit more from the province’s complete communities and carbon reduction agenda, and contribute more to their success, than the post-war Apartment Tower Neighbourhoods that have been the subject of this study.

With many Apartment Towers entering their fifth decade, this housing stock now requires significant reinvestment. A prime opportunity exists to make this reinvestment about more than just bringing individual buildings into a state-of-good-repair. Tower Neighbourhood Renewal can bring together refurbishment of individual buildings with a program for environmental, social and economic renewal of entire neighbourhoods. In so doing, it can help to implement provincial policy directions related to creating complete communities and enable a prosperous, equitable and sustainable Greater Golden Horseshoe, and Ontario as a whole.
1.0

Purpose and Approach
1.0 Purpose and Approach

Purpose
The Greater Golden Horseshoe’s (GGH’s) pattern of urbanization is unique in North America. This is a result of the significant development of modern apartment housing that occurred in the post-war period, roughly between 1945 and 1984, though concentrated between 1960 and 1980.

As a result, the GGH contains a heritage of nearly 2,000 post-war concrete residential apartment towers located in neighbourhoods throughout the region. The quantity and distribution of these towers is unique in the world, and helps give the Greater Toronto and Hamilton Area (GTHA) a density nearly double that of Greater Chicago.

These structures have aged and many of them now require reinvestment. Among the most energy inefficient housing forms in the region, they also tend to be associated with areas of high social need. In Europe, a process known as Tower Neighborhood Renewal has resulted in the refurbishment of apartment towers themselves, and revitalization of surrounding neighbourhoods. Many of the goals of Tower Neighbourhood Renewal – improved energy efficiency, poverty reduction, intensification and urban revitalization – are key areas of provincial interest in Ontario and have been active areas of provincial policy development over the past few years.

The goal of this report is to gather enough data on Apartment Towers and Apartment Tower Neighbourhoods in the Greater Golden Horseshoe to understand the potential for the Province to strategically support the renewal of these neighbourhoods across the region, in a way that aligns with provincial priorities, such as implementing the Growth Plan for the Greater Golden Horseshoe 2006, creating a network of regional rapid transit, as well as priorities regarding energy conservation, greenhouse gas (GHG) reduction, poverty reduction, affordable housing and the green economy.

Scope
The focus of this study are the groupings of Apartment Towers known as Apartment Tower Neighbourhoods. Apartment Towers under investigation are the concrete frame, “tower-in-the-park” type multiple residential buildings associated with the post-war housing boom. More specifically, for the purpose of this study, Apartment Towers are buildings meeting these criteria that are eight storeys or greater built between 1945 and 1984. The study does not include the significant number of high-rise buildings built since 1984.

This building type has been identified as having particular attributes that would benefit from the general strategies typically associated with Tower Neighbourhood Renewal in other jurisdictions. The construction methods and architecture were remarkably consistent during the post-war era, and buildings greater than eight storeys* begin to achieve the critical mass considered a pre-condition for various renewal options.

An important feature of this study is that it looks beyond the towers themselves, to consider the overall Apartment Tower Neighbourhood. Many of these buildings were built as part of master planned communities and, as will be seen, they are often clustered together in neighbourhoods. As such, Tower Neighbourhood Renewal in this study refers not just to the renewal of individual buildings, but to the renewal of the

For the purpose of this study, Apartment Towers are residential buildings eight storeys or greater built between 1945 and 1984.

Note
*The Statistics Canada definition of residential high-rise is five storeys and above. For the purpose of the study, buildings five to seven storeys were excluded, with focus placed on Apartment Towers eight storeys and above. Buildings five to seven storeys from the study period represent an additional 1155 buildings in the GGH, or 37.5 per cent of all high-rise buildings from the study era.
Study Area:
Greater Golden Horseshoe (GGH):

The geographic scope of this study is the region known as the Greater Golden Horseshoe, as defined under the Places To Grow Act, 2005. The GGH stretches from Peterborough in the east, to Waterloo and Niagara in the west, and Georgian Bay in the north.

Greater Golden Horseshoe (GGH):
Population (2006): 8,071,402
Greater Toronto and Hamilton Area (GTHA):
GTHA without Toronto:
Toronto:
Outer Ring of the GGH:
Population (2006): 2,022,381
Statscan 2006
Methodology
The primary data source for characterizing and analysing the target building stock was 2006 Municipal Property Assessment Corporation (MPAC) data. MPAC data is used for property assessment purposes by the Ontario government and is the most up-to-date inventory of buildings in the Province. Because the precise characteristics of Apartment Towers, as defined for this study, do not relate to a single MPAC building-type code, a series of MPAC codes were selected that generally captured all buildings over eight storeys that include a residential component. A secondary process of visual confirmation was used to verify the buildings that met the initial criteria, as well as identify towers that were missed due to missing or incorrect data in the MPAC inventory.

Other key data sources for primary research included the 2006 Transportation Tomorrow Survey (e.g., transit use, trip lengths and auto ownership) and the 2006 Census for information related to social need and demographics in Apartment Towers. Additional information related to the housing stock was gained through Canada Mortgage and Housing Corporation housing start data.

Supplementary information included relevant provincial policy documents, as well as local and international case studies related to tower refurbishment.

To investigate linkages with areas of provincial policy interest, the study team conducted a series of interviews in December 2009 and January 2010 and a workshop in June 2010 with staff from the ministries of Transportation, Energy, Infrastructure, Municipal Affairs and Housing, Finance, the Ontario Financing Authority and Metrolinx. Staff from the Ministry of the Environment were also consulted.

A detailed description of the study methodology is available in the Technical Appendices.

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Miles Glendinning, Director, Scottish Centre for Conservation Studies and Reader in Architecture, Edinburgh College of Art.
2.0 Introduction
2.1 Apartment Towers in the Greater Golden Horseshoe

The building type and planning principals that characterize the post-war, concrete, residential Apartment Towers that are the subject of this study fall generally in line with the ideas of post-war modernism that proliferated the globe during this time period. The building type in question can generally be classified as ‘tower-in-the-park’ – concrete frame, multi-unit buildings surrounding by significant open space (generally between 50 per cent to 90 per cent of the site area) and generally consisting of exclusively residential functions.

Originating in Europe, this housing type proliferated around the globe as a key aspect of international modernist planning and architecture. Able to meet acute housing demand through rapid construction and mass production, while providing a high standard of amenity and modern conveniences, the modern tower block was the predominant housing form of post-war European reconstruction. Variations of this type adapted to local context can be found worldwide, notably throughout Europe, the former Soviet Union, Asia, as well as North and South America.

In the Canadian experience, this building type was readily adapted to the challenges of post-war expansion, particularly in the Greater Golden Horseshoe (GGH). However, unique to the European or American experience, the majority of these towers were privately developed and financed for an eager market of young couples, empty nesters and newcomers to the region, resulting in a significant high-rise housing boom roughly between 1960 and 1980.* In the Toronto area this consisted of hundreds of thousands of units, outpacing the development of the single-family home by a ratio of more than two to one.** These buildings became a significant feature of new communities in the expanding suburbs, and helped characterize the landscape of the modern region.

This is in sharp contrast to the general American experience, where this building type was largely used for inner city public housing, and rarely used in suburban areas or built by private developers. As will be further elaborated in the body of the report, the presence and distribution of these towers within the GGH is an anomaly within the North American context, yet consistent with post-war suburban housing forms found in Europe and elsewhere as a result of the planning trends mentioned above.*** This housing legacy represents a remarkable period of regional and community planning requiring thoughtful consideration.

Apartment Tower Neighbourhoods: The Smart Growth of the Post-War Era

The entry of the “tower-in-the-park” type, and the large modern apartment neighbourhood into the Ontario housing scene was the result of a convergence of influences, including:

- innovations by the Canadian construction industry, such as the flying form method of concrete frame construction that increased the speed and efficiency of high-rise construction;
- public planning policy that actively promoted high-rise construction in new communities - both to provide the density to maximize infrastructure investment as well as provide new housing options; and
- an able private development industry eager to meet continued demand for apartment housing.

“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. …”

Richard Buckminster Fuller, 1968

Development Timeline

*The bulk of the target building type was built between 1960 and 1980 (89 per cent), with 6.5 per cent built prior to 1960 and 4.5 per cent built in the early 1980s. The beginning of the boom coincides with the adoption of the concrete high-rise housing typology in the early 1950s, and the end of the boom relates to a shift in high-rise typology and the slowdown of the housing market in the early 1980s. The youngest building found conforming to the typological criteria was completed in 1984.

International Comparables

**The GGH’s pattern of suburban Apartment Tower development shares similarities with international jurisdictions, however this comparison is not an exact one. The specific arrangement of towers in the GGH, their method of construction, the volume of private development, and the integration of Apartment Tower clusters with low-rise family housing, shopping centres, and other structures typical of North American suburbia provides a landscape perhaps globally unique. Further comparative analysis is required in this regard.

Flying Form

***The flying form is a method of concrete construction where formwork is reused and hoisted from floor to floor for rapid construction. Pioneered in Toronto in the early 1960s, it is standard practice today.

Images

01-02) Plan for Erin Mills, Mississauga, 1969
03) Plan for Don Valley Village, Toronto, 1965
04) Plan for Flemingdon Park, Toronto, 1958
05) Plan for Eglinton Flats, Toronto, 1966
Other key factors include the criticism of the dense apartment housing conditions that arose in the immediate post-war years (notably along Jameson Avenue and St. George Street in Toronto). Studies of these districts resulted in recommendations that all large apartment buildings have 60 per cent or more open space, and generally conform with what has become known as the tower-in-the-park typology. Additional influences came from both the public and private development communities, who launched large-scale projects in the 1950s which made strong reference to contemporary European projects that were underway as a part of reconstruction. Seminal early projects include City Park Apartments (1954) and Regent Park South (1958) in downtown Toronto.

The key initiator of the high-rise housing boom was the master planned suburban ‘new towns’ of Thorncliffe and Flemingdon Park, located in the northeast periphery of what was then Metropolitan Toronto (planned in 1955 and 1958 respectively). Privately initiated and developed, these projects were the first high-rise apartment satellite communities in North America. They were modelled on contemporary European projects, particularly those in the United Kingdom and Scandinavia, and included retail, employment (in the form of services jobs and light industry), large parks, and large apartment suites for families. As part of the original plan, Flemingdon Park was to house the new CBC headquarters as the anchor tenant of a planned cultural district.

Considered a more ‘responsible use of land’ than the interwar, and immediate post-war, low-density sprawl, higher-density Apartment Tower Neighbourhoods gained acceptance by local planning authorities, and became a mandatory element in new communities.

By the 1960s, the Metropolitan government prescribed minimum density requirements for new outward growth, in order to maximize efficiencies of public infrastructure – such as sewage – as well as support public transit, both the local bus system as well as planned rapid transit. An additional goal was the provision of a wider range of housing choice within new communities. Furthermore, these high-density districts were to be catalysts for commercial, cultural and community uses to enable ‘self sufficiency’ within suburban neighbourhoods.

The result was the proliferation of high-rises throughout the region. Clusters of towers met density requirements while allowing for large areas of low-rise family housing, natural systems and industrial employment zones. In many cases, such as in Don Valley Village in the then Borough of North York, as much as 50 per cent of all housing was developed as high-rise Apartment Towers.

In the best examples, these clusters were thoughtfully planned as diverse community hubs, adjacent to retail, community centres, employment and transit. In many cases, they were the centres of new communities housing tens of thousands of residents. Examples can be found throughout the former Metropolitan Boroughs as well as the region as a whole, such as Erin Mills in Mississauga, Bramalea in Brampton, and the Ajax City Centre among others.

As the boom progressed, projects varied in quality, from award-winning community plans to less coordinated groupings of towers erected in response to individual development opportunities, rather than as part of any comprehensive neighbourhood planning. In general, the more complicated commercial, cultural and infrastructure investments planned for these neighborhoods (such as rapid transit) were often beyond the scope of the tower developers and, therefore, were not realized. As a result, the projects that typify the boom generally lacked the detailed master planning of the seminal examples that had catalyzed the acceptance of apartment communities in the early years.

“...In Toronto...the continent’s private enterprise-dominated housing system, when coupled with a structure of strong regional planning dedicated to the fostering of high-density ‘hot spots’ in the centre and periphery, succeeded in generating a landscape of massed towers and slabs in open space, almost rivalling the USSR in consistency and grandeur.”

-Miles Glendinning

Introduction to the Domocomo Journal 39 dedicated to post-war mass housing

Notes

*The policies related to the development of Apartment Towers and Apartment Tower Neighbourhoods within the Metropolitan Toronto planning area are well documented – roughly consisting of today’s City of Toronto as well as portions of York, Durham and Peel Regions. The specific planning history of Apartment Towers in the other GGH municipalities require further study.

**The full rapid transit program anticipated in the early planning for Metropolitan Toronto was not realized, with much of suburban transit limited to the surface bus network. As a result, Apartment Towers were primarily oriented to the arterial road system and designed with the expectation of a high degree of car ownership among residents.

Images

01) Thorncliffe Park, Toronto, 1971
02) Don Valley Village, Toronto, late 1960
03) Thorncliffe Park, Toronto, late 1960
04) Jane and Exbury Towers, Toronto, early 1970s
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984
2.2

Opportunity of Tower Neighbourhood Renewal

With many Apartment Towers entering their fifth decade, this housing stock now requires thoughtful reinvestment. Current concerns include deteriorating building conditions and performance, as well as trends of increased poverty and marginalization in the surrounding Apartment Tower Neighbourhoods. A potential strategy for remediation and reinvestment in these buildings and communities is Tower Neighbourhood Renewal.

Tower Neighbourhood Renewal is a reinvestment and refurbishment strategy that renders aging tower blocks as a key urban asset. The world over, reinvestment has transformed Apartment Tower Neighbourhoods into models of vibrant communities and urban sustainability. Tower Neighbourhood Renewal – through green refurbishment, site diversification and social investment – has been common practice in the European Union (EU) since the late 1990s. European Tower Renewal has led to energy use reductions of 50 per cent in existing buildings, as well as turned formerly isolated neighbourhoods into integrated, diverse and productive city districts through investments in infrastructure, community services, public space, and the addition of new mixed income housing and commercial developments.

Through retrofit and regeneration, the aim of Tower Neighbourhood Renewal is to enable tower communities to achieve their full potential as prosperous, vibrant and sustainable places. As a result, Tower Neighbourhood Renewal is conceived as a comprehensive approach to neighbourhood reinvestment, coordinating desired energy, growth, economic development and livability outcomes.

These efforts are evident throughout the EU with particular leadership in Germany, Sweden, the Netherlands and the United Kingdom. Many of these precedents are explored as case studies throughout this report.

In Ontario, we have an opportunity to learn from the best international examples, while developing innovative solutions best suited to the Canadian urban context.

Tower Neighbourhood Renewal provides an opportunity to review the original intent of this housing and the neighbourhoods in which it lies, and to renew its role as a key housing resource within the GGH in a way that complements new provincial policy directions related to creating complete, compact, transit supportive, low-carbon and equitable communities.

Specific opportunities of Tower Neighbourhood Renewal are outlined below:

**Reduce Energy Use**
Currently among the region’s most wasteful housing type, refurbishment and renewal of individual towers can reduce greenhouse gas production by as much as 50 per cent. In addition to the renewal of individual buildings, existing Apartment Tower Neighbourhoods provide the opportunity for the establishment of distributed clean energy systems and local resource networks, including co-generation and biomass from waste streams.

**Increase Transit Ridership**
As concentrated areas of higher density, and with many Apartment Tower residents relying on public transit as their primary means of transport,
Global Precedents for Tower Renewal
Apartment Tower Neighbourhoods provide an important ridership base for transit. With larger neighbourhoods containing thousands of residents (with some well over 10,000), these areas can provide a critical mass to support planned investments in rapid transit.

**Achieve Vibrant, Compact and ‘Complete’ Communities**
While Apartment Tower Neighbourhoods have higher density, many currently suffer from a lack of local services, as well as poor access to fresh food and employment opportunities. This is often due to restrictive single-use residential zoning, unchanged since the 1960s. The large, often underused parcels of land that are typically associated with individual Apartment Towers provide an opportunity to diversify land-uses and give residents of both the towers themselves and the surrounding Apartment Tower Neighbourhoods greater access to services and employment opportunities, as well as to introduce more diversified housing types. Through targeted infill and intensification, Apartment Tower Neighbourhoods have the potential to evolve into vibrant, diverse, and self-sufficient communities.

**Address Areas of Social Need**
In recent decades, many Apartment Tower Neighbourhoods have become popular housing choices for low income families and New Canadians. These residents tend to have different needs and less mobility than the demographic for which these communities were originally designed. Through the provision of services, amenities and opportunities responsive to these needs, Apartment Tower Neighbourhoods can emerge as dynamic and equitable communities. Strategies could include introduction of community led programming, expanding opportunities for entrepreneurs through land-use diversification, the provision of greater connectivity between tower neighbourhoods and the region as a whole through transit investment, and the general upgrade of this important affordable housing resource.

**Build the Green Economy**
Environmental refurbishment of Apartment Towers represents a significant opportunity for growing Ontario’s green economy, including trade, manufacturing and innovations jobs. With nearly 2,000 towers throughout the GGH, in addition to large clusters in Ottawa, London and other Ontario municipalities, Tower Neighbourhood Renewal represents a potentially significant market upon which to develop a home-grown green economy and related industries, making Ontario a laboratory for sustainable innovation.

**Current Local Efforts: Tower Renewal, City of Toronto**
The City of Toronto was the first jurisdiction in Canada to embrace Tower Renewal. In September 2008, Toronto City Council endorsed Mayor’s Tower Renewal – an emerging policy direction for the City of Toronto with the goal of integrating Tower Renewal with municipal processes. The program element of Tower Renewal is based on the Opportunities Book, commissioned by the Mayor’s Office and completed by ERA Architects and the University of Toronto, as well as the Mayor’s Report, developed by the Mayor’s Office and an internal City working group. These documents outline a holistic set of values and objectives:

- **Green Neighbourhoods:** significantly reducing environmental impact;
- **Complete Communities:** providing the full range of community services and amenities;
- **Heritage:** retaining the existing building stock and thoughtfully responding to the built, natural and community heritage; and
- **Quality:** engaging in Tower Renewal according to best practice for a well designed and beautiful city.
The City of Toronto has now established a Tower Renewal Office with the mandate of leading programs and policies for city-wide Tower Renewal and has selected four pilot sites in which to explore renewal opportunities. These pilot projects are intended to help the City to develop the policy framework and skill-set required to establish Tower Renewal on a broader city-wide scale.

Between 2008 and 2010, the City of Toronto commissioned the following studies to developed a city-wide strategy for Tower Renewal:

- Tower Renewal Guidelines, Technical Guide to over-cladding (John H. Daniel’s Faculty of Architecture, Landscape and Design, co-sponsored by the Canada Mortgage and Housing Corporation, City of Toronto and the Toronto Atmospheric Fund);
- Tower Renewal Community Energy Plans (Arup);
- Tower Renewal Waste Management Strategy, (Genivar);
- Tower Renewal Financing Feasibly Study, (Morrison Park Advisors); and
- Tower Renewal Financing Implementation Study.

The findings of these reports were culminated into the “The Tower Renewal Implementation Book”, endorsed by Toronto City Council in July 2010. Primarily focused on green building refurbishment, the Implementation Book establishes a ‘STEP’ program for Tower Renewal, outlining how owners can incrementally achieve low carbon buildings through phased building upgrade.

The report also recommended the creation of a city run Tower Renewal Corporation, that would aid in financing of building retrofits through access to pools of low interest financing. The Tower Renewal Office is now in the process of developing the details of the Tower Renewal Corporation, as well as beginning to examine the wider planning policy implications of Tower Neighbourhood Renewal.

Additional Work Related to Tower Neighbourhood Renewal in Ontario

Various complementary initiatives and investigations have been completed or are currently underway related to Tower Neighbourhood Renewal. They include but are not limited to:

- Apartment Neighbourhood Walkability Studies, University of Toronto and Jane’s Walk;
- High-Rise Apartment Livability Study, United Way Toronto (Forthcoming, 2010);
- High-Rise Documentary Series, National Film Board of Canada, highrise.nfb.ca;
- Financing and Economics of Affordable Housing Development, CURA, University of Toronto and St. Christopher House;
- Toronto Community Housing Corporation: Tower Renewal Feasibility Studies;
- York University: Global Suburbanism, including post-doctorate positions further studying apartment neighbourhoods and Tower Neighbourhood Renewal; and
- Numerous courses, faculty and student research at a number of local colleges and universities.

To date, considerable progress has been made related to better understanding the current condition of Apartment Towers in the local context, as well as strategies related to renewal, notably environmental refurbishment. However, further work remains to be done in developing a framework to achieve the full scope of Tower Neighbourhood Renewal, particularly related to complete communities.
3.0

Taking Stock

The following is a collection of research highlights to help better understand the Apartment Tower housing resource within the Greater Golden Horseshoe.
3.1 1,925 Apartment Towers
Apartment Towers are a Major Component of the GGH’s Housing Stock

Overview
There are 1,925 Apartment Towers in the Greater Golden Horseshoe (GGH). Collectively, these towers contain 383,838 units, representing 13 per cent of all households in the GGH. That means about one in every seven and a half households in the GGH are in an Apartment Tower. In the Greater Toronto and Hamilton Area (GTHA), this ratio increases to one in every six households.

A significant number of Ontarians live in Apartment Towers. If a conservative metric of 2.6 people per household is applied, it can be estimated that Apartment Towers house approximately one million people, or roughly 12 per cent of the total GGH population. However, this number may be higher, according to recent studies* indicating that Apartment Tower units often house large numbers of individuals that are unaccounted for in Census data.

Apartment Buildings Five to Seven Storeys
In addition to the 1,925 Apartment Towers under study that are eight storeys and over, there are an additional 1,155 apartment buildings from the study era between five and seven storeys, which are considered high-rise by Statistics Canada. These buildings have been excluded from the larger study. However, these buildings exhibit many of the characteristics of the Apartment Towers under study, including distribution and socio-economic attributes. These buildings contain an additional 112,753 units. Taking into account all apartment buildings from the study era five storeys and over, the GGH contains a total of 3,080 apartment buildings and 496,591 apartment units, or 17 per cent of all housing units in the GGH. Further information related to apartment buildings five to seven storeys can be found in the Technical Appendices.

Images
01) Eight storeys and over: Eighteen storey Apartment Tower, Former Borough of Scarborough
02) Five to seven storeys: Seven storey apartment building, Mississauga
03) Single Family Homes
04) Contemporary Condominiums

Note
*United Way Toronto High-rise Apartment Livability Study, (Forthcoming, 2010).
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Apartment Towers Related to Total Housing Stock in the GGH

- **Apartment Towers**: 395,908 units (13%)
- **Additional Units from Study Era (5-7 storeys)**: 114,760 units (4%)
- **All Other Housing Units in the GGH**: 2,404,784 units (83%)
- **Total Units in GGH**: 2,961,375

Units in Apartment Towers Compared to Single Family Homes in the GGH

- **Units in Apartment Towers in GGH**: 1,000,838 units (25%)
- **Single Family Homes in GGH**: 1,518,700 units (75%)

Relation to Other Housing Types:

**SINGLE FAMILY HOME**: The number of households in Apartment Towers is equivalent to 25 per cent of the households in the GGH living in single-family homes. Within the GTHA this number increases to 40 per cent, meaning there is an Apartment Tower unit for every 2.5 single-family homes.

**ALL HIGH-RISE HOUSING**: Apartment Towers represent the majority of multiple residential housing in the region. They consist of 67 per cent of all high-rise residential buildings in the GGH as defined by Statistics Canada (multiple housing five storeys and above). Within the GTHA this number increases to 69 per cent, and in Toronto it is 74 per cent.

These findings are based on data from the 2006 Census by Statistics Canada, and from Canada Mortgage and Housing Corporation from 2006 to 2009.
3.2 Location
Apartment Towers are Found Throughout the GGH

Overview
Apartment Towers can be found throughout the GGH. Over two-thirds of upper and single-tier municipalities in the GGH have Apartment Towers as part of their housing mix.

The majority of Apartment Towers, 62 per cent, are found in Toronto. Twenty-nine per cent are found in the GTHA without Toronto, and nine per cent of Apartment Towers are found in the municipalities that make up the Outer Ring of the GGH.

The majority of the Apartment Towers in the GGH are found outside of downtowns, in the inner and outer suburbs. Only 14 per cent of Apartment Towers are located in urban growth centres, which are typically the historic downtowns and city centres of the region’s larger cities.

Regional Comparison
Within the North American context, this volume and distribution of Apartment Towers is unique, contrasting the typical condition of locating high-rise housing in city centres. The database Emporis provides a global listing of building of all types 12 storeys and over within metropolitan regions comparable in scale to the GTHA. According to the analysis undertaken for this report, 66 per cent of the GGH’s Apartment Towers are 12 or more storeys, with 95 per cent of these in the GTHA. In North America, this is higher than the total number of buildings 12 storeys and over of all types, including office, than any other Metropolitan region other than New York.

<table>
<thead>
<tr>
<th>Metropolitan Region</th>
<th>High-rise Buildings Over 12 Storeys (all types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>5,568</td>
</tr>
<tr>
<td>Greater Toronto and Hamilton Area</td>
<td>2,321 (1,205 Apartment Towers 12 Storeys or more)</td>
</tr>
<tr>
<td>Greater Chicago</td>
<td>1,111</td>
</tr>
<tr>
<td>Greater Vancouver</td>
<td>614</td>
</tr>
</tbody>
</table>

Data from Emporis, Spring 2010

Tower Distribution
GTHA
Within the GTHA, the majority of Apartment Towers are found in Toronto (68 per cent), with large concentrations outside of Toronto found in Peel (13 per cent), and Hamilton (11 per cent), as well as Halton (five per cent), Durham (two per cent), and York (one per cent).

OUTER RING OF THE GGH
Of the nine per cent of the total stock located in the GGH’s Outer Ring, the largest concentrations are found in the Region of Waterloo (39 per cent) and Niagara Region (23 per cent), with additional towers found in Peterborough County (13 per cent), Guelph (12 per cent), Simcoe County (seven per cent), Brant County (six per cent), Northumberland County (one per cent) and Dufferin County (< one per cent).

<table>
<thead>
<tr>
<th>Location</th>
<th>Apartment Towers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Golden Horseshoe</td>
<td>1,925</td>
</tr>
<tr>
<td>Greater Toronto and Hamilton Area</td>
<td>1,752</td>
</tr>
<tr>
<td>Toronto</td>
<td>1,189</td>
</tr>
<tr>
<td>GTHA without Toronto</td>
<td>563</td>
</tr>
<tr>
<td>Outer Ring of GGH</td>
<td>173</td>
</tr>
</tbody>
</table>
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Towers, 8 Storeys +: 1,925
Towers, 12 Storeys +: 1,267
Towers, 18 Storeys +: 488

The height of Apartment Towers under study range from eight to over 50 storeys. Larger towers (18 storeys or more) are generally located in the GTHA, with the largest concentrations found in Toronto, Mississauga and Hamilton. In the Outer Ring, the majority of towers are below 12 storeys; however, towers 18 storeys or higher can be found in Kitchener-Waterloo and Port Hope.
Taking Stock 3.2  Tower Neighbourhood Renewal in the Greater Golden Horseshoe

Inventory
Location of Apartment Towers in the GGH

Location: COUNTY OF SIMCOE
- Towers: 3
- Units: 370
- Site Area (Ha): 2.09

Location: CITY OF ORILLIA
- Towers: 1
- Units: 110
- Site Area (Ha): 2.8

Location: CITY OF BARRIE
- Towers: 9
- Units: 1,146
- Site Area (Ha): 8.38

Location: COUNTY OF DUFFERIN
- Towers: 1
- Units: 164
- Site Area (Ha): 0.9

Location: REGION OF YORK
- Towers: 22
- Units: 3,639
- Site Area (Ha): 24.91

Location: CITY OF GUELPH
- Towers: 20
- Units: 1,135
- Site Area (Ha): 17.1

Location: REGION OF WATERLOO
- Towers: 67
- Units: 7,307
- Site Area (Ha): 65.62

Location: CITY OF BRANTFORD
- Towers: 10
- Units: 1,030
- Site Area (Ha): 8.87

Location: COUNTY OF BRANT
- Towers: 1
- Units: 104
- Site Area (Ha): 1.8
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Location: CITY OF PETERBOROUGH
Towers: 22
Units: 2,058
Site Area (Ha): 19.5

Location: COUNTY OF NORTHUMBERLAND
Towers: 2
Units: 1,294
Site Area (Ha): 4.23

Location: REGION OF DURHAM
Towers: 38
Units: 6,041
Site Area (Ha): 46.61

Location: CITY OF TORONTO
Towers: 1,189
Units: 279,997
Site Area (Ha): 1,431.4

Location: REGION OF PEEL
Towers: 221
Units: 36,746
Site Area (Ha): 313.61

Location: REGION OF HALTON
Towers: 84
Units: 1,506
Site Area (Ha): 87.89

Location: CITY OF HAMILTON
Towers: 196
Units: 26,471
Site Area (Ha): 138.62

Location: REGION OF NIAGARA
Towers: 39
Units: 4,116
Site Area (Ha): 34.55

Legend
- Apartment Towers (Not to Scale)
- Delineated built up areas
- Greater Golden Horseshoe (GGH)
- Greater Toronto and Hamilton Area (GTHA)
- Boundary of upper and single-tier municipalities
- Outer Ring of the GGH
- GTHA without Toronto
- Toronto

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

There are 1,925 Apartment Towers in the GGH, ranging in height from eight to 50 storeys.

Greater Toronto and Hamilton Area, with Waterloo Region, City of Guelph, City of Brantford / Brant County, Dufferin County and Northern end of Niagara Region

Legend
- Orange: Approximate Urban Growth Centre Boundary
- Red: Apartment Tower, 18 Storeys and over
- Blue: Apartment Tower, 12 - 17 Storeys
- Cyan: Apartment Tower, 8 - 11 Storeys
- Green: Designated Greenbelt Area

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team's interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25 Year Plan for the Regional Rapid Transit and Highway Network".
Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Energy and Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”.

Legend
- Approximate Urban Growth Centre Boundary
- Apartment Tower, 18 Storeys and over
- Apartment Tower, 12 - 17 Storeys
- Apartment Tower, 8 - 11 Storeys
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Legend
- Apartment Tower, 18 Storeys and over
- Apartment Tower, 12 - 17 Storeys
- Apartment Tower, 8 - 11 Storeys
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.”
Tower Neighbourhood Renewal in the Greater Golden Horseshoe

Overview

Apartment Towers in the GGH are generally found in clusters (i.e. within 150 metres of another tower). In the GGH, 89 per cent of all Apartment Towers are found in clusters of two or more, and 62 per cent are found in clusters of five or more. Only 11 per cent are found in isolation.

This phenomenon is a legacy of the planning approach that characterized Apartment Towers, which often encouraged that towers be built in clusters, forming Apartment Tower Neighbourhoods. The more sophisticated clusters were designed as satellite centres, coordinated with transit, employment and retail. An example is Toronto’s Thorncliffe Park, begun in the 1950s as the region’s first planned suburban ‘new town’ focussed around Apartment Towers. Though the majority of Apartment Tower Neighbourhoods did not undergo the same detailed master planning process of these earlier projects, clustering of towers became a common trend throughout the development period.

Clustering is most prevalent in the GTHA without Toronto, where only six per cent of towers are found in isolation. In the Outer Ring, however, Apartment Towers are far more dispersed, with 50 per cent of Apartment Towers found outside of clusters.*

Large Clusters

With over 62 per cent of Apartment Towers in clusters of five or more, large apartment clusters are a ubiquitous form throughout the region. This is most pronounced in the GTHA, where 66 per cent of Apartment Towers (1156 Towers) are found in 94 large clusters. These large clusters create significant concentrations of population. Of these large clusters, over 78 per cent contain more than 1,000 households, and 40 per cent contain more than 2,000 households. The largest of these Apartment Tower clusters contain more than 10,000 households. These clusters create a decentralized pattern of higher-density housing unique to North America.

Density

Apartment clusters often contain higher densities. Densities taken at the neighbourhood scale provide an accurate measure of the average neighbourhood, or district gross density, yet generally suppresses concentrations of higher densities within larger areas. As a result, the actual ‘lived’ densities of Apartment Tower Neighbourhoods are not often adequately represented. Taking into account tower clusters and their immediate vicinity, the net densities of groupings of apartment properties, excluding adjacent land uses, range from 150 to 350 people per hectare (pph), and in some areas have been found to reach 500 pph and higher.

Notes

*The factors accounting for the unique patterns of distribution between the GTHA and Outer Ring is a recommended area of future study.
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Cluster Examples

The following is a selection of clusters found throughout the region, ranging in size and geography. This random sampling is organized from smallest to largest collection of units.

**Ritson Rd, Oshawa:**
8 Towers, 1,076 units

**Kingsway Dr., Kitchener:**
5 Towers, 1,464 units

**Oakville Trafalgar:**
9 Towers, 1,975 units

**Port Credit, Mississauga:**
15 Towers, 1,802 units

**Centennial and Barton, Hamilton:**
15 Towers, 2,529 units

**Bramalea, Brampton:**
10 Towers, 3,541 units

**Bloor and Dixie, Mississauga:**
26 Towers, 3,350 units

**Burnhamthorp and Hurontario, Mississauga:**
16 Towers, 5,009 units

**Dixon and Kipling, Toronto:**
15 Tower, 6,105 units

**Bathurst and Steeles, Toronto:**
31 Towers, 6,950 units

**Don Mills Peanut, Toronto:**
31 Towers, 7,067 units

**Crescent Town, Toronto:**
26 Towers, 10,352 units

**Downtown Hamilton:**
83 Towers, 12,404 units

**Yonge and Eglinton, Toronto:**
57 Towers, 13,219 units

Mapping Clusters

The map detail to the left (image 01), illustrates the concentration of large clusters in the west of Toronto and the east of Peel Region. A full sequence of maps can be seen in the following pages.

The Peanut, (Image 02), at Don Mills Rd., between Sheppard and Finch Aves., in the former Borough of North York, is an example of a master planned cluster, as discussed in Section 2.1.
In the GGH, 89 per cent of all Apartment Towers are found in clusters of two or more, and 62 per cent are found in clusters of five or more. Only 11 per cent are found in isolation.
01) Simcoe County 02) Niagara Region 03) City of Peterborough

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”.

Legend
- Approximate Boundary of Urban Growth Centre
- Cluster of 5 or more Apartment Towers
- Cluster of 2-4 Apartment Towers
- Isolated Apartment Towers
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH

USA
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Greater Golden Horseshoe
Legend

Cluster of 5 or more Apartment Towers
Cluster of 2-4 Apartment Towers
Isolated Apartment Towers
Designated Greenbelt Area
Roadway
Boundary of Jurisdictions within GGH

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.”
3.4 Large Properties
Apartment Towers Sit on Large Properties

Overview
Apartment Towers are generally situated on large land parcels. This is a legacy of open space ratios as high as 90 per cent, which were encouraged as part of the original site plan requirements at the time of development, to achieve the “tower-in-the-park” configuration.

The total land resource in the GGH on which Apartment Towers are situated is 2,197.5 hectares. Of this, 93 per cent is located in the GTHA.

Forty-seven per cent of Apartment Tower parcels in the GGH are greater than one hectare. With a typical building footprint of 10-20 per cent of site area, this suggests a significant amount of unbuilt space associated with these buildings. Apartment Tower properties less than 0.5 hectares in size account for only seven per cent of the buildings in the region.

The potential significance of the land area associated with Apartment Towers is even greater when the clustering phenomenon described in Section 3.3 is taken into account. Fifty-seven per cent of Apartment Tower properties share a property line with another Apartment Tower site. These adjacent parcels create large and contiguous areas of land. Collectively, these clustered Apartment Tower parcels represent approximately 1,640 hectares of land.

Parcel Distribution
GTHA
Smaller parcels tend to be located in older urban areas, where Apartment Towers were often built as infill or redevelopment. Larger parcels are generally associated with towers that were built as part of greenfield developments and master planned communities. In Hamilton for instance, 52 per cent of all Apartment Tower properties are less than 0.5 hectares, with only 22 per cent of properties larger than one hectare. The opposite trend is found in Mississauga, where 58 per cent of properties are one hectare and over, and only 15 per cent of properties are less than 0.5 hectares.

OUTER RING OF GGH
The Outer Ring follows a unique pattern from the GTHA, with the majority of properties between 0.5 and one hectare, and the trend described above with respect to property location and size less pronounced.

Images
01) Apartment Property in the former Borough of North York
02) West Toronto and Peel Region
03) Detail, Toronto, Don Valley Parkway and Highway 401
04) Detail, Toronto, Downtown
Total Hectares of Apartment Tower Sites by Property Size

- **Apartment sites less than 0.5 ha**: 14.4 ha (3% of 502 towers)
- **Apartment sites between 1 ha and 0.5 ha**: 381.6 ha (76% of 502 towers)
- **Apartment sites greater than 1 ha**: 1,665.1 ha (17% of 502 towers)

Total Hectares of Apartment Tower Sites by Clusters of Adjacent Properties

- **2-3 Adjacent Properties**: 666.6 ha in 167 clusters
- **4+ Adjacent Properties**: 987.1 ha in 108 clusters
- **Single Properties**: 555.8 ha in 834 parcels

Legend (for images 03, 04)
- Approximate Boundary of Urban Growth Centre
- Cluster of directly adjacent properties
- Property boundary, greater than 1 ha
- Property boundary, between 0.5 ha and 1 ha
- Property boundary, less than 0.5 ha
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metropolitan Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.”
In the GGH, 47 per cent of Tower properties are larger than 1 ha, and 57 per cent are directly adjacent to another Tower property.
Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.”
### Overview

The vast majority of Apartment Towers were developed as rental apartments. Housing policy during the study period encouraged high-rise rental within new communities as a key component of the housing mix. This was to meet demands for affordable housing for a variety of tenure groups, as well as provide the densities necessary to optimize infrastructure efficiency and, in the case of Toronto, meet population targets established by the Metropolitan Planning Board.

Seventy-nine per cent of Apartment Towers in the GGH are rental tenure, representing 33 per cent of the total rental stock in the GGH. Within the GTHA this increases to 40 per cent, and 48 per cent in Toronto.

Unlike most high-rise construction today, Apartment Tower units were often built as family housing. Specific data related to unit size in GGH Apartment Towers is not available. However, recent studies* confirm a large concentration of larger units within Apartment Towers. A random sampling of ten buildings conducted by the research team resulted in a unit breakdown of 32 per cent three-bedroom, 43 per cent two-bedroom and 25 per cent one-bedroom. Further study is required to determine the full breakdown across the GGH.

### Public and Private Ownership

The majority of Apartment Towers in the region are privately owned and operated, however, the exact breakdown is currently unknown, and requires detailed study. In Toronto, approximately 85 per cent of towers are in private ownership.

The vast majority of public housing in Toronto is owned and operated by the Toronto Community Housing Corporation (TCHC). TCHC is the largest social housing provider in Canada, as well as the largest owner of Apartment Towers in the GGH. Public owners have several advantages in conducting renewal efforts related to economies of scale, financing, and having a corporate social mandate.

### Note

*United Way Toronto High-rise Apartment Livability Study, (Forthcoming, 2010).
Rental Apartment Towers Related to all Rental in the GGH

- Rental Apartment Towers: 287,581 Units
- All Other Rental Units in the GGH: 581,799 Units

Total Rental Units in GGH: 869,380

Rental Apartment Towers Related to All High-Rise Rental in the GGH

- Apartment Towers: 287,581 Units
- All Other High-Rise Rental Units in the GGH: 30,981 Units
- Additional High-Rise Rental Units from Study Period (5-7 Storeys): 96,368 Units

Total High-Rise Rental Units in GGH: 414,930

Tenure Mix of Apartment Towers
Seventy-nine per cent of Apartment Towers are rental tenure (both private and public), 17 per cent are condominiums, and the remaining four per cent includes a mixture of tenures including cooperatives – equity (0.4 per cent), non-equity (1.1 per cent), and co-ownership (0.2 per cent) – as well as seniors housing (0.3 per cent) and student residences (0.2 per cent).

High-Rise Rental Housing
The Apartment Towers under study represent the vast majority of high-rise rental housing in the GGH (69.5 per cent), increasing to 72 per cent in the GTHA and 77 per cent in Toronto. The development of high-rise rental housing became increasingly rare following the study period, with the majority of post-1984 high-rise housing developed as condominiums. As a result, only 7.5 per cent of high-rise rental housing was developed after the study period. Twenty three per cent of the high-rise rental housing stock are buildings from the study era that are five to seven storeys.

Condominiums
The 17 per cent of Apartment Towers that are condominiums were generally developed in the second half of the post-war housing boom, following the introduction of the Condominium Act in 1968. A handful of rental apartments were converted to condominia.
3.6 Social Need
Apartment Towers Tend to be Located in Areas of High Social Need

Overview
Seventy-seven per cent of all Apartment Towers in the GGH are found in Census Dissemination Areas considered to have high or very high social need, while only 12 per cent of towers are found in areas considered to have low or very low social need. In some cases these Dissemination Areas are comprised entirely of Apartment Towers, while in other cases the Dissemination Areas may include other forms of housing.

On a scale of one to five, where one represents very low social need and five represents very high social need, the average GGH tower has a score of 4.08. The average Apartment Tower in Toronto has a score of 3.98, while the average in the GTHA without Toronto is 4.21, and the Outer Ring is 4.30.

Clearly, there is a strong correlation between Apartment Tower Neighbourhoods and areas of high social need. This is more pronounced in the GTHA without Toronto and in the Outer Ring of the GGH than it is in Toronto, where Apartment Towers can also be found in relatively affluent areas, notably along the Yonge Street corridor. Further information related to Apartment Towers and social need can be found in United Way Toronto's High-rise Apartment Livability Study (Forthcoming 2010).

Defining Social Need
Social need, as defined for this study, is an aggregated measure of households with high proportions of:
• lone-parent families;
• persons below the Census low-income cut-off;
• persons 25 years of age and over with no educational certificate, diploma or degree;
• family income from government transfers;
• unemployment; and
• persons aged 65 and over.

For further information refer to Technical Appendices.

Apartment Towers and Health Equity
A number of recent studies, such as Toronto Public Health’s Unequal City, and Poverty is Making Us Sick, by the Wellesley Institute and the Community Social Planning Council of Toronto, point to strong links between poverty and poor health. The poorest Ontarians have a lower health status (as measured by both morbidity and premature mortality) than moderate income Ontarians, who in turn have a lower health status than middle-income Ontarians, and so on. Although this study did not assess health status in Apartment Tower Neighbourhoods, the well-documented linkages between socio-economic status and health, combined with the findings of this study related to social need and Apartment Tower Neighbourhoods, would suggest that health equity is a significant issue in these neighbourhoods.

Legend
- High and Very High Social Need
- Low and Very Low Social Need

[Map showing Apartment Towers in Areas of High and Very High Social Need (77%) and Low and Very Low Social Need (12%)]

Legend
- High and Very High Social Need
- Low and Very Low Social Need

50km
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Social Need by Category

<table>
<thead>
<tr>
<th>Social Need</th>
<th>Number of Towers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Social Need</td>
<td>223 Towers</td>
</tr>
<tr>
<td>Moderate Social Need</td>
<td>206 Towers</td>
</tr>
<tr>
<td>High Social Need</td>
<td>634 Towers</td>
</tr>
<tr>
<td>Very High Social Need</td>
<td>036 Towers</td>
</tr>
<tr>
<td>Very Low Social Need</td>
<td>11 Towers</td>
</tr>
</tbody>
</table>

Total Towers: 1,910*
* Number of Towers with data available for query

Per Cent of Apartment Towers with High and Very High Social Need by Location

<table>
<thead>
<tr>
<th>Location</th>
<th>High and Very High Social Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTHA</td>
<td>90%</td>
</tr>
<tr>
<td>Toronto</td>
<td>57%</td>
</tr>
<tr>
<td>GTHA (w/o) Toronto</td>
<td>33%</td>
</tr>
<tr>
<td>GGH Outer Ring</td>
<td>10%</td>
</tr>
</tbody>
</table>

General Lack of Mixed-Use

Though planned to be mixed-use at a district scale, many Apartment Tower Neighbourhoods lack access to daily conveniences within walking distance. Generally, neighbourhood facilities, services and retail were not integrated into Apartment Tower Neighbourhoods, but rather designed for easy access by vehicle. This presents a more challenging commute on foot or by transit, and leaves large residential areas devoid of activity.

As a result, Apartment Tower Neighbourhoods often lack convenient access to the services and amenities that offer employment opportunities and address community needs. A full 62 per cent of rental Apartment Towers are zoned exclusively for residential purposes. An additional 17 per cent contain a mix of use limited to a small commercial unit, often a small tuck shop or convenience store. Less than one per cent of Apartment Towers are zoned ‘mixed development’ that allows diverse and extensive retail and services, such as Crescent Town in southeastern Toronto.

Images

01-02) Apartment Tower with single-use zoning, surrounded by surface parking
In the GGH, 77 per cent of Apartment Towers are found in Census Dissemination Areas considered to have high or very high social need, while only 12 per cent of towers are found in areas considered to have low or very low social need.

Greater Toronto and Hamilton Area, with Waterloo Region, City of Guelph, City of Brantford / Brant County, Dufferin County and Northern end of Niagara Region

Legend

- Very High Social Need
- High Social Need
- Moderate Social Need
- Low Social Need
- Very Low Social Need

Designated Greenbelt Area

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “20-Year Plan for the Regional Rapid Transit and Highway Network”.

USA
Tower Neighbourhood Renewal in the Greater Golden Horseshoe

01) Simcoe County 02) Niagara Region 03) City of Peterborough

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government. Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”.

Legend
- Very High Social Need
- High Social Need
- Moderate Social Need
- Low Social Need
- Very Low Social Need

Designated Greenbelt Area

Roadway

Boundary of Jurisdictions within GGH
Greater Golden Horseshoe

Legend

- Very High Social Need
- High Social Need
- Moderate Social Need
- Low Social Need
- Very Low Social Need

Designated Greenbelt Area

Roadway

Boundary of Jurisdictions within GGH

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team's interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network."
Residents of Apartment Towers Use Cars Less Often than Other Residents of the GGH

Overview
Residents of Apartment Towers in the GGH are more frequent users of public transit than other residents within the same municipality. Using data from the 2006 Transportation Tomorrow Survey, sixty-two per cent of Apartment Towers were found to be within geographic “traffic zone” areas with higher than average public transit use for their respective municipalities.

A similar trend can be seen with respect to walking and cycling. Fifty-eight per cent of Apartment Towers are in zones with higher than average rates of walking and cycling. This finding is consistent with the findings of the walkability survey research undertaken by Paul Hess of the University of Toronto and Jane Farrow of Jane’s Walk. Those surveys have consistently identified high rates of dependence on walking and cycling in Apartment Tower Neighbourhoods, despite the frequent lack of amenities for pedestrians and cyclists in these neighbourhoods.

In contrast to the higher than average rates of transit use, walking and cycling, 70 per cent of Apartment Towers are located in zones with lower than average car ownership rates.

Collectively, these findings indicate a trend towards alternative forms of transportation amongst residents of Apartment Towers. Further study would be required to determine the extent to which this trend is due to the socio-economic situation of these residents, the level of transit service that is available to them, and/or the built form of the neighbourhood.
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Apartment Towers with Above Average Transit Ridership

- All Other Towers: 735 Towers (38%)
- Above Average* Transit Ridership: 1,190 Towers (62%)

Total Towers in GGH: 1,925
*As compared to municipal average in which tower is situated

Apartment Towers with Below Average Car Ownership

- All Other Towers: 594 Towers (30%)
- Below Average* Car Ownership: 1,331 Towers (70%)

Total Towers in GGH: 1,925
*As compared to municipal average in which tower is situated

Apartment Towers with Above Average Walking/Cycling

- All Other Towers: 809 Towers (42%)
- Above Average* Walking/Cycling: 1,116 Towers (58%)

Total Towers in GGH: 1,925
*As compared to municipal average in which tower is situated

Walkability Studies
Between 2008 and 2010, the University of Toronto and Jane’s Walk conducted walkability studies in eight neighbourhoods in the inner suburbs of Toronto with large concentrations of high-rise apartments. Directed by Paul Hess and Jane Farrow, the study consisted of over 30 focus groups with residents. Focus groups revealed that residents are highly reliant on walking and transit to make their regular trips to the grocery store, to work, or to school. Two-thirds of participants report getting most of their errands and shopping done locally, mainly on foot. In the case of grocery shopping, about 50 per cent of participants say they rely strictly on walking to get their groceries and, in some areas, more than 90 per cent of respondents say they walk their children to school. For more information, visit: www.Janeswalk.net.
Overview

Apartment Towers are among the highest energy users of all housing types in the region, and are collectively responsible for a considerable volume of residential GHG emissions. In various studies, Apartment Towers have been found to be among Ontario’s most energy intensive buildings, with data suggesting they require as much as 25 per cent more energy per square metre compared to a single detached house.*

Based on the most recently available studies, the Community Energy Plan Report prepared by Arup for the City of Toronto’s Tower Renewal Office, and the Tower Renewal Guidelines, prepared by the John H. Daniels Faculty of Architecture at the University of Toronto for Canada Mortgage and Housing Corporation, estimates for GHG production from Apartment Towers range from 5.3 to 5.8 tonnes per unit. In a similar study in the United Kingdom, annual GHG production for tower block flats ranged from 3.5 to 6.8 tonnes per year.** If these ranges are aggregated across all Apartment Towers in the GGH, total GHGs for the operation of Apartment Towers would be between 2.0 to 2.2 million tonnes annually. This represents roughly six per cent of GHG’s produced by all buildings in Ontario, with Apartment Towers in Toronto responsible for roughly 23 per cent of its residential GHG emissions.***

It is important to note that these estimates are based solely on the energy used for building operation. They do not reflect total household energy use related to transportation and other factors. Therefore, actual GHG emissions attributable to Apartment Towers and their residents would be much higher than the estimate given here.

Note on GHG Figures

*The recent studies discussed in this section have documented energy use from sample Apartment Towers ranging from 1.05 Gigajoules per square metre of floor space (GJ/m²) to 1.4 GJ/m², with some buildings as high as 1.7GJ/m². Natural Resources Canada data places apartments developed between 1946 and 1969 at an average of 1.25 GJ/m², compared to single-family homes which average 1.0 GJ/m².

** Road Map to 60% - Eco-Refurbishment of 1960s Flats - Energy Saving Trust, 2008.

Share of Toronto’s GHGs

***The City of Toronto’s Power to Live Green Report (2009) estimates that Toronto’s total GHG production as a result of natural gas and electricity usage is 14.7 megatonnes. Of this, 6.45 megatonnes, or 44 per cent, is from the residential sector. Based on this, we estimate that Toronto’s Apartment Towers are responsible for approximately ten per cent of all GHGs related to natural gas and electricity usage and 23 per cent of residential GHGs produced by residential buildings in Toronto.
Building Code Era

While generally Apartment Towers from the study era perform poorly in terms of energy use, variables in construction methods over the duration of the housing boom (1945-1984) give buildings a range of energy performance attributes. Energy performance is highly related to the condition of the building envelope (among other variables), which would relate to the building code at the time of construction. As part of the analysis, Apartment Towers have been divided into building code eras in order to establish a framework for further analysis in which physical attributes can be attributed to these eras of construction, both related to building code regulations specifically, and trends in building construction more generally.

Building codes in effect during the period of construction of the target housing resource are as follows:

- 1953 National Building Code
- 1960 National Building Code
- 1965 National Building Code
- 1970 National Building Code
- 1976 Ontario Building Code
- 1984 Ontario Building Code

Solid Waste

Apartment Towers are significant producers of solid waste, with generally poor diversion rates in relation to municipal and provincial household averages. For example, organics diversion, such as the GreenBin program in Toronto, has yet to introduced into most Apartment Towers.

The most recent study focusing on waste production and diversion rates in Apartment Towers was conducted by Genivar for the City of Toronto’s Tower Renewal Office. This study indicates average waste generation per unit of 601 kg, with an average diversion rate of 12 per cent. Extrapolated across the region, at this diversion rate, over 200,000 tonnes of waste may go to landfill each year from Apartment Towers in the GGH.

Images

01) Containing hundreds of households, targeting Apartment Towers for green refurbishment may be a more efficient strategy for GHG reduction than individual detached houses.

02) Current waste management practices in Toronto’s Apartment Towers typically result in lower than average diversion rates, significant GHG production as a result of transporting waste to landfill, and an impoverished physical environment.
4.0
The Opportunity for Tower Neighbourhood Renewal in the Greater Golden Horseshoe

Many of the goals that are typical of Tower Neighbourhood Renewal initiatives in European jurisdictions coincide closely with recent areas of provincial policy development. Increasing transit use, reducing poverty, reducing greenhouse gas emissions, and creating complete communities are central tenets of Tower Neighbourhood Renewal. They are also key areas of provincial interest. Through recent initiatives such as The Big Move – Metrolinx's Regional Transportation Plan, the Poverty Reduction Strategy, the Go Green Action Plan on Climate Change, and the Growth Plan for the Greater Golden Horseshoe, the Province is seeking to achieve a number of the same goals that Tower Neighbourhood Renewal has successfully achieved elsewhere.

In this section, we explore the links between Tower Neighbourhood Renewal and these areas of provincial policy interest, and suggest locations in the Greater Golden Horseshoe (GGH) where there may be particularly high potential for Tower Neighbourhood Renewal to help achieve these provincial priorities.

This analysis places focus on large apartment clusters, which are defined as groupings of five or more Apartment Towers.
4.1 Supporting Regional Transit Investment and Alternative Transportation Modes

Context
The Big Move - Metrolinx’s 2008 Regional Transportation Plan (RTP) for the Greater Toronto and Hamilton Area (GTHA) - sets out a series of strategies, policy recommendations and infrastructure investment priorities that are intended to transform the region’s transportation system into a truly multi-modal system that is seamless, coordinated, efficient, equitable and user-centred.

The 25-year vision of the RTP includes:
• reducing the distance that people drive every day by one-third;
• reducing reliance on private automobiles such that one-third of trips to work are taken by transit, and one in five are taken by walking or cycling; and
• reducing per person GHG emissions from passenger transportation by half.

Key strategies in the RTP include:
• building a comprehensive regional rapid transit network across the GTHA;
• implementing integrated walking and cycling networks for the GTHA;
• planning a system of connected mobility hubs at key intersections in the transit network; and
• planning, designing and building the transportation system to create pedestrian-, cycling-, and transit-friendly communities.

Tower Neighbourhood Renewal provides an opportunity to support these RTP strategies.

Discussion
As discussed earlier in this report, residents of Apartment Towers tend to have higher than average transit ridership. They also exhibit higher than average rates of walking and cycling, and lower than average rates of car ownership. These findings, as well as the tendency for Apartment Towers to be clustered in groupings of higher density, strongly suggest that Apartment Tower Neighbourhoods are important markets for alternative modes of transportation.

The challenge currently is the poor access that these towers have to fast, frequent regional rapid transit. While most of them have access to varying levels of local bus service, only 17 per cent of Apartment Towers are in close proximity (within 500 metres) to regional rapid transit. The RTP’s 25-year regional rapid transit network would significantly improve this situation. The first phase of the RTP, the “Big Five” projects, will provide direct access to 28 per cent of Apartment Towers, and the full 25-year Metrolinx Plan will provide direct access to 64 per cent of towers.

Given the already strong tendencies of Apartment Tower residents to use transit, and their relative dependence on transit due to lower than average car ownership rates, Apartment Tower Neighbourhoods have significant potential to function as the ridership anchors of the RTP transit network. While the RTP network will bring transit to the doorsteps of many more residents in the region, Apartment Towers can generate the riders that will make that network viable.
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Apartment Towers Within 500 m of Existing Regional Rapid Transit

- 83% within 500 m of existing rapid transit
- 17% further than 500 m from existing rapid transit

Apartment Towers Further Than 500 m from Existing Rapid Transit

- 1,750 Towers

Apartment Towers Within 500 m of Metrolinx ‘Big Five’

- 28% within 500 m of Big Five
- 72% further than 500 m from Big Five

Apartment Towers Further Than 500 m from the Metrolinx Big Five

- 1,550 Towers

Apartment Towers Within 500 m of Metrolinx Plan 25-Year Regional Rapid Transit Network

- 64% within 500 m of all planned regional rapid transit
- 36% further than 500 m from all planned regional rapid transit

Apartment Towers Further Than 500 m from All Planned Regional Rapid Transit

- 1,352 Towers

Total Towers in GGH: 1,925

Images

01) Cover of Metrolinx Regional Transportation Plan, The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area
02) Metrolinx full system map, as planned
As detailed planning proceeds for the RTP transit network, an understanding of Apartment Towers can help to guide decisions on routing and station location. With 18 per cent of Apartment Towers in the GTHA within planned mobility hubs (measured as 800 metres from the station site), there is an opportunity to improve their integration as part of mobility hub master plans.

A key implementation mechanism for the RTP will be municipal Transportation Master Plans (TMPs). With 72 per cent of Apartment Towers still more than 500 metres from regional rapid transit after the completion of the initial Big Five projects, and 36 per cent more than 500 metres away after full RTP implementation, the role of local transit will be critical to providing service and access to the residents of these neighbourhoods. Likewise, the Active Transportation Master Plans that the RTP suggests be undertaken as part of municipal TMPs can explore ways to shift more of the short trips originating in these neighbourhoods onto walking or cycling.

The Ministry of Transportation’s Transit Supportive Land Use Planning Guidelines (TSLUG), which are currently being updated, are another opportunity to recognize the important role that Apartment Tower Neighbourhoods can play in fostering high levels of transit use. Land use guidelines tailored to the unique circumstances of Apartment Tower Neighbourhoods would be a valuable component of the new TSLUG. This would be facilitated by further analysis of individual tower neighbourhoods to identify the different neighbourhood typologies and the types of transit supportive land use changes that may be appropriate in different circumstances.

**Taking A Closer Look - Large Cluster Analysis**

While all Apartment Towers are potentially important buildings blocks of the transit system, areas with large clusters of several buildings warrant a particularly strong emphasis.

The series of maps beginning on page 56 show locations within the GGH with clusters of five or more Apartment Towers that currently exhibit higher than average transit ridership. Collectively, these represent nearly half of all Apartment Towers in the GGH (43 per cent).
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Apartment Towers and Planned Rapid Transit

Legend
- Apartment Towers within 500 m of Metrolinx 25-year Regional Rapid Transit Network
- Apartment Towers further than 500 m of Metrolinx 25-year Regional Rapid Transit Network
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team's interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network". Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
Large Apartment Clusters with Higher than Average Transit Ridership

This map illustrates clusters with high-potential to attract transit ridership to planned rapid transit; large clusters of five or more towers with above average transit ridership. Collectively, these represent nearly half of all Apartment Towers in the GGH (43 per cent).

Greater Toronto and Hamilton Area, with Waterloo Region, City of Guelph, City of Brantford / Brant County, Dufferin County and Norther end of Niagara Region

Legend

- Above Average Transit Cluster
- All Other Apartment Towers
- Planned Metrolinx Light Rail / Bus Rapid Transit (RT)*
- Existing and Planned TTC Subway/RT
- Planned KW Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”.

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
**Tower Neighbourhood Renewal in the Greater Golden Horseshoe**

01) Simcoe County

02) Niagara Region

03) City of Peterborough

**Legend**
- Above Average Transit Cluster
- All Other Apartment Towers
- Planned Metrolinx Light Rail / Bus RT*
- Existing and Planned TTC Subway/RT
- Planned KW Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”. Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TRC).
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

**Greater Golden Horseshoe**

**Legend**

- **Above Average Transit Cluster**
- **All Other Apartment Towers**
- **Planned Metrolinx Light Rail / Bus RT**
- **Existing and Planned TTC Subway/RT**
- **Planned KW Light Rail**
- **Planned Gateway Mobility Hub**
- **Planned Anchor Mobility Hub**
- **Designated Greenbelt Area**
- **Roadway**
- **Boundary of Jurisdictions within**

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”.

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
European Best Practices in Integrating Transit Investment within Existing Apartment Neighbourhoods

Similar to the GGH, many modern Apartment Tower Neighbourhoods found in European cities were conceived as master-planned communities with a well-defined neighbourhood centre organized around a transit connection to the city centre. In other cases, new transportation hubs have been inserted into existing tower neighbourhoods as part of Tower Neighbourhood Renewal strategies, bringing rapid transit, as well as new investment, to these neighbourhoods.

The following are a series of strategies related to transit investment within Apartment Tower Neighbourhoods, and the pictures on the following page illustrate several examples.

Integrating Transit Stations with Apartment Towers

In Amsterdam’s Bijlmermeer, renovated metro stations are situated along two lines that bound the edges of this Apartment Tower neighbourhood (07). Attractive and comfortable new transit stations are integrated into the street in Hammarby Sjostad, Stockholm (03), and a convenient and safe LRT, bicycle and pedestrian-only transit corridor winds through Rietlanden and the Eastern Docklands in Amsterdam (05).

Transit Investment as Tower Neighbourhood Renewal Catalyst

In Vallingby, a master-planned post-war neighbourhood on the outskirts of Stockholm (08), transit passengers emerge from the metro into a vibrant commercial plaza, at the centre of an Apartment Tower Neighbourhood that has recently undergone extensive restoration and redevelopment. In Halle Neustadt in Germany, a new metro station has facilitated commercial investment and a new public square at the centre of an existing tower community (04). In both of these cases, the station creates heavy pedestrian traffic that makes the centre of the neighbourhood an attractive and viable location for retail and commercial activity.

Improved Pedestrian Environment

Many Apartment Tower Neighbourhoods in Europe have been renewed to include safe, attractive and convenient streets, paths and sidewalks that encourage residents to walk or bike for many of their local trips (09 to 13). In the Bijlmermeer, bicycling and walking around the neighbourhood has been improved by the introduction of a vast network of paths, many of which tunnel through the base of the original tower blocks (01 & 02). These cycle and pedestrian networks connect Apartment Towers to rapid transit stations.

High Quality Bicycle Infrastructure

Part of what makes bicycling a viable option for high-rise living is finding secure and convenient ways to store your bicycle. Bicycle storage structures established as part of Swedish Tower Neighbourhood Renewal initiatives in Hammarby Sjostad, Stockholm (14), and Backa Rod, Göteborg (16), offer security and convenience, and help animate the shared outdoor spaces that surround them.

Image
Commercial Plaza Atop Metro Station in Vallingby Tower Neighbourhood, Stockholm, Sweden
European Best Practice
Transit strategies

01-02) Improved connectivity: bicycle paths through towers in Bijlmermeer, Amsterdam, NL
03) LRT station in Hammarby Sjostad, Stockholm, Sweden
04) New U-Bahn station and plaza as part of renewal in Halle Neustadt, Germany
05) LRT routing through neighbourhood in Rietlanden, Amsterdam, NL
06-07) New metro station(s) in Bijlmermeer, Amsterdam, NL
08) New metro connection catalyst to new commercial plaza, Halle Neustadt, Germany
09) Bicycle paths and pedestrian environment in Amsterdam, NL
10) Bicycle environment in suburban Amsterdam, NL
11) Pedestrian environment in Marzahn, Berlin, Germany
12) Pedestrian environment on new main street in Bijlmermeer, Amsterdam, NL
13) Lijnbaan Pedestrian shopping street, Rotterdam, NL
14) Bicycle storage facilities in Hammarby Sjostad, Stockholm, Sweden
15) Bicycle storage facilities at University of California Berkeley, California
16) Bicycle storage facilities in Backa Rod, Göteborg, Sweden
4.2 Supporting Poverty Reduction

Context
Ontario’s Poverty Reduction Strategy, adopted in 2008, sets a target of reducing the number of children living in poverty by 25 per cent over the next five years. The strategy is intended to be comprehensive, addressing issues of income, through measures such as increases to the Ontario Child Benefit, but also other critical contributors to poverty such as school readiness, educational attainment, health care and housing. The strategy is also focused on expanding the success of New Canadians, through education and skills training, as well as streamlining entry into Ontario’s professions.

Expanding the availability of affordable housing is an important part of the strategy. Since 2003, Ontario has funded approximately 35,000 housing allowances and provided funding for the development and/or refurbishment of 22,000 affordable housing units in Ontario. The 2008 Ontario Budget committed $100 million for social housing providers to repair existing social housing, including energy efficiency upgrades.

As was demonstrated in Section 3.6, there is a strong correlation between Apartment Tower Neighbourhoods and areas of social need. This suggests that Tower Neighbourhood Renewal can be a key element of the Province’s Poverty Reduction Strategy.

This correlation also suggests that Tower Neighbourhood Renewal can be an important part of achieving the Province’s health equity goals. The Ministry of Health and Long-term Care has made health equity – addressing health disparities among difference groups in the province – as an explicit policy objective of Local Health Integration Networks. One of the most effective ways to reduce health inequities is by addressing the social determinants of health, such as housing, income, nutrition and social inclusion, all potential elements of Tower Neighbourhood Renewal.

Discussion
Several opportunities exist to integrate Tower Neighbourhood Renewal with the goals and programs of Ontario’s Poverty Reduction Strategy. The large property areas within Apartment Clusters discussed in Section 4.4 and 4.6, which are often underused, provide potential sites for key services, housing options and programs.

A central tenet of the Poverty Reduction Strategy is to break the intergenerational cycle that makes poverty such an insidious problem. Consequently, the strategy focuses first on Ontario’s children. Apartment Towers are home to a significant number of young Ontarians. Half of all Apartment Towers in the region have 20 per cent or more of the resident population under 19 years of age. In some Apartment Tower communities, over 40 per cent of residents are under the age of 19.*

As Apartment Tower Neighbourhoods are home to high concentrations of youth in areas of high social need, there is significant potential to integrate Tower Neighbourhood Renewal with Poverty Reduction Strategy programs, such as the expansion of Parenting and Family Literacy Centres, Ontario Early Years Centres and After School Programs. The Community Use of Schools Program and Com-
munity Hub Program, through which the government provides funding to make school space available for community activities, can provide the central gathering places that many of these neighbourhoods so desperately need. Tower Neighbourhood Renewal presents an opportunity to introduce new amenities and activities for youth, such as active recreation areas, as well as youth specific programming in new infill buildings or within existing towers themselves. The physical process of retrofit and regeneration will also provide opportunities for apprenticeships and construction related jobs.

The Poverty Reduction Strategy is also focused on expanding opportunities for newcomers. Apartment Towers are among the first homes in Canada for newcomers. Half of the Apartment Towers in the region have more than half of residents that were born outside of Canada. In 60 per cent of Apartment Towers, over 10 per cent of residents arrived in Canada after 2001. In some cases, this can be as high as 50 per cent.*

The Poverty Reduction Strategy provides funding to community-based not-for-profit organizations across Ontario to support new immigrants in achieving their potential through the Newcomer Settlement Program. Apartment Tower Neighbourhoods could be integrated with skills training, employment services, newcomer information centres, and English as a Second Language courses to ease arrival and entry into the workforce.

Tower Neighbourhood Renewal can also bring new employment opportunities to what are currently isolated neighbourhoods through land-use diversification that will enable seasonal markets, ground floor commercial conversions, and mixed-use infill. Enhanced transit service and the introduction of new retail and service uses can significantly increase Apartment Tower residents’ access to a wide range of employment and entrepreneurial opportunities.

In many European Apartment Tower Neighbourhoods, local citizens groups and not-for-profit organizations have played critical roles in developing and implementing grassroots initiatives. These initiatives are as much a part of Tower Neighbourhood Renewal as the larger-scale interventions discussed throughout this report and include community gardens, skills training, youth sports programs, child play programs, elder care programs, open space beautification and maintenance programs, the publication of community newspapers and websites, community associations, small business networks and incubators, as well as organizing community festivals. Recognizing the important role played by the not-for-profit sector and community agencies is an important theme of the Poverty Reduction Strategy, and it is supported through specific measures such as the Community Opportunities Fund, which provides funding to local community revitalization projects. A successful local example is the East Scarborough Storefront.**

The integration of Apartment Tower Neighbourhoods with a wide range of health services, social services, and local access to fresh food would help address health equity and the wide ranging needs of the resident population as a whole. With the expected doubling of people 65 years of age and older over the next 25 years, providing services for long-term care as well as ensuring full accessibility, as related to Ontario’s Accessibility Plan, will enable Apartment Tower Neighbourhoods to provide key housing to meet the needs of this aging population.

**The East Scarborough Storefront provides a venue for dozens of community agencies and services, and helps facilitate community organizing initiatives and opportunities for community voice, leadership and mobilization. Located in a former police station directly adjacent to a group of Apartment Towers, the Storefront provides community services where they are needed most. Currently fundraising for an expansion, the Storefront provides a unique model for Tower Neighbourhoods throughout the GGH. For more information, visit www.thestorefront.org.
Access to affordable housing is a key concern of the Poverty Reduction Strategy, the Long-Term Affordable Housing Strategy currently under development, and concurrent initiatives, such as the Ontario Human Rights Commission provincial consultation on human rights and housing. Apartment Towers are home to many individuals who have high social need. As a result, the majority of the region’s 380,000 units offer housing at varying degrees of affordability. Only a fraction of this housing, some 15 per cent in the case of Toronto, is public affordable housing. The majority is private rental housing, rendered affordable through a low position within the housing market, often due to geographic isolation, lack of amenities, and poor state of repair. Furthermore, as discussed in Section 3.5, much of this housing stock is two or three bedroom apartments, providing a considerable legacy of affordable family housing. The volume of privately owned Apartment Towers and their function as affordable housing - and affordable family housing - is a unique characteristic of the GGH.

The ample open space within Apartment Tower Neighbourhoods provides an opportunity for thoughtful infill development to increase the region’s affordable housing stock, through the inclusion of new housing options, such as affordable home ownership, cooperatives and not-for profit housing, as well as housing forms specific to the needs of seniors, young families and other demographics.

In addition to opportunities for community investment, a primary aspect of Tower Neighbourhood Renewal is to retain and modernize this important housing stock through physical upgrades, maintaining it as a key resource for future generations. An additional opportunity lies in ensuring energy security for low-income tenants through environmental refurbishment of Apartment Towers. Green upgrades will reduce energy usage and cost, preventing rent and utility spikes as the cost of energy rises. This will also aid in the reduction of greenhouse gases (GHGs). A full compliment of energy reduction measures will be discussed in Section 4.3.

Taking a Closer Look - Large Cluster Analysis
While a significant proportion of Apartment Towers are associated with areas of social need, large clusters of several towers demand particular attention. The series of maps beginning on page 68 show locations in the GGH where there are clusters of five or more Apartment Towers in areas of high or very high social need. Collectively, these represent about half of all Apartment Towers in the GGH (45 per cent).

These locations, containing large and dense populations, would be expected to benefit the most from the introduction of the programs and initiatives that comprise the Poverty Reduction Strategy.
Opportunities 4.2 Tower Neighbourhood Renewal in the Greater Golden Horseshoe
Large Apartment Clusters and Social Need

This map illustrates clusters of five or more towers with high or very high social need. Collectively, these represent about half of all Apartment Towers in the GGH (45 per cent).

Legend
- High and Very High Social Need Cluster
- All Other Apartment Towers
- Planned Metrolinx Light Rail / Bus Rapid Transit (RT)*
- Existing and Planned TTC Subway/RT
- Planned KW Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within

*Planned transit refers to the Metrolinx 25-Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”.

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
Tower Neighbourhood Renewal in the Greater Golden Horseshoe

01) Simcoe County
02) Niagara Region
03) City of Peterborough

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network".

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).

Legend

- **High and Very High Social Need Cluster**
- **All Other Apartment Towers**
- **Planned Metrolinx Light Rail / Busway**
- **Existing and Planned TTC Subway/RT**
- **Planned K/W Light Rail**
- **Planned Gateway Mobility Hub**
- **Planned Anchor Mobility Hub**

**Designated Greenbelt Area**

**Roadway**

**Boundary of Jurisdictions within**

20km
Greater Golden Horseshoe

**Legend**

- **High and Very High Social Need Cluster**
- **All Other Apartment Towers**
- **Designated Greenbelt Area**
- **Roadway**
- **Boundary of Jurisdictions within**

"Planned transit refers to the Metrolinx 25-Year Regional Rapid Transit Network. Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government. Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.” Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC)."
European Best Practices in Social and Community Investment within Apartment Neighbourhoods

Apartment Tower Neighbourhoods across the European Union have experienced significant social investment as part of Tower Neighbourhood Renewal programs. Strategies include the provision of amenities and services responsive to residents’ needs, support for grassroots community initiatives, and enabling entrepreneurial opportunities within tower neighbourhoods. This process has improved the access to job opportunities for residents, as well as contributed to community cohesion and neighbourhood pride.

The following are a series of strategies related to social and community investment within Apartment Neighbourhoods, and the pictures on the following page illustrate several examples.

Introducing New Social and Community Services
New community facilities in Apartment Tower Neighbourhoods in Poptahof, Delft (image 01 & 02) and Schultze-Boysen-Straße, Berlin (03), offer residents access to new recreational, educational and social programs as part of a strategy to combat inequality, and elevate the livability of the neighbourhood.

Establishing Community Gathering Places
New public spaces for passive and active recreation are a key component of Tower Neighbourhood Renewal. These sites can host farmers and vendor’s markets, as well as community festivals as in the case of Swiss Cottage in London’s Camden Borough (05).

Building Common Area Upgrades
The renewal of the Kruithuis Apartment Tower in the Bijlmermeer in Amsterdam consolidates mail boxes at each of the buildings’ entrances (04) as a strategy to create space that encourages neighbourliness and a strong sense of community. In Gardsten Göteborg, greenhouses were added to building ground floors, to create year round gardening opportunities (07).

Improving Safety
Improvements to Apartment Towers such as new vestibules and the introduction of a concierge, such as in Berlin’s Markisches Viertel, increase resident convenience and perceptions of safety (08). Visually striking new light fixtures line a new path in Holmbladsgade, Copenhagen as part of a strategy to improve the safety and image of the neighbourhood (06). The path, called ‘Prags Boulevard’, includes a diverse set of recreational zones along its length, which attract a diversity of users, and injected the neighbourhood with a new vibrancy of which the local residents are extremely proud.

Youth Programming
Brondby Strand is a neighbourhood in suburban Copenhagen with a large population of youth considered to be at risk. In 2002, at the outset of renewal in the neighbourhood, local boys expressed that they would like to create and run their own meeting place. This idea led to the creation of ‘Træns Drenge’ (Crane Boys), a meeting place that offers a range of recreational (09), educational and social programs that has been credited with reducing crime and increasing youth employment rates in the neighbourhood. Much of the success of the project is attributed to the fact that the meeting place was created out of a process of mutual trust, and that the boys were given influence and responsibility.

Local Economic Development
Strategies to create local jobs in the Bijlmermeer operate at different scales. Still under construction, the ArenA district (10) immediately west of the neighbourhood will bring 50,000 new jobs, and is intended to be a regionally significant employment centre. At a smaller scale, workshop space is incorporated into the base of some of the Apartment Towers in the neighbourhood (11). The organization of markets and the addition of permanent kiosks, can be a vehicle for local businesses, as well as providing needed services to residents.

Combatting Stigmatization
Many Apartment Tower Neighbourhoods in Europe have been stigmatized as undesirable neighbourhoods. Landmark art, public space and community events as part of the renewal process can change perceptions of neighbourhoods, as well as empower residents. An example are building mural walls in Amsterdam’s Bijlmermeer (13).

Reception and Integration Resources for Newcomers
The Idea Stores in East London (15 & 16) provide ethically and linguistically diverse communities with the resources that they need to ease entry into the community and the local economy. The Idea Stores include traditional library lending, a wide range of adult education classes, career support, training, community meeting areas, as well as cafes and facilities for arts and leisure pursuits. The facility also includes retail spaces to facilitate local economic development.

Image
‘IdeaStore’, Social Service and Community Hub integrated into ‘Poplar’ Tower Neighbourhood
London, UK
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984
European Best Practice

Social investment strategies

01) Open air market and new grocery store at base of tower block, Moscow, Russia
02) Meeting room in Community resource centre in Poptahof, Delft, NL
03) New community centre in Schulze-Boysen-Straße, Berlin, Germany
04) Place to meet neighbours, new mailboxes in Bijlmermeer, Amsterdam, NL
05) Farmers Market at Swiss Cottage, London, UK
06) New lights improve safety and image of Holmbladsgade, Prags Blvd., Copenhagen, DK
07) New greenhouse and laundry facility at tower base, Garsten, Göteborg, Sweden
08) New entrance improves safety in Markisches Viertel, Berlin, Germany
09) Sports programs engage local youth in Brondby Strand, Copenhagen, DK
10) The ground floor of a tower is converted to work space in the Bijlmermeer, Amsterdam, NL
11) The ArenA district brings 50,000 jobs at the edge of the Bijlmermeer, Amsterdam, NL
12) In Poptahof, a Kiosk stores play equipment which is rented out to local children in exchange for good deeds in Poptahof, Delft, NL
13) Public art on the side of a tower helps re-brand the Bijlmermeer, Amsterdam, NL
14) Signage in Poptahof publicizing the neighbourhoods transformation, Delft, NL
15) The Idea Stores in East London offer a library, meeting rooms, education and employment resources and other services to the ethnically diverse residents of the Chrisp Street Estate, London, UK
16) Library / Community Fitness centre, Swiss Cottage, London, UK
4.3 Reducing Greenhouse Gas Emissions

Context
The Province’s Go Green: Ontario’s Action Plan on Climate Change sets targets for GHG emission reductions. The Go Green Plan estimates that if Ontario were to continue with “business-as-usual”, emissions in 2020 would be 72 megatonnes (Mt) higher than 1990 levels. Instead, by 2014, the Go Green Plan seeks a reduction of Ontario’s GHG emissions to six per cent below 1990 levels (a reduction of 11 Mt of carbon dioxide equivalents (CO2e) relative to 1990 levels). By 2020, Ontario’s target is to reduce GHG emissions to 15 per cent below 1990 levels (a reduction of 27 Mt of CO2e relative to 1990 levels). By 2050 Ontario plans to reduce GHG emissions to 80 per cent below 1990 levels.

Energy used by existing buildings for space and water heating accounted for 17 per cent of Ontario’s emissions in 2007. The Go Green Plan indicates that energy use by homes will need to account for at least five per cent of the GHG reductions needed to achieve the 2020 target.

Since the adoption of Go Green in 2007, the Government of Ontario has introduced a number of initiatives to achieve these targets. These include the Green Energy Act, Building Code changes, the Energy Efficiency Act, and the introduction of Bill 185, proposed legislation that would allow for the development of a cap-and-trade system. The Ontario Power Authority and the Canadian Urban Institute are working with pilot communities in the GGH to develop and implement energy mapping processes into community energy planning.

The Province has also established ambitious goals for alternative energy sources. As one example, the Province is contributing to the Quality Urban Energy Systems of Tomorrow (QUEST) project which is looking to quantify the potential for integrated community energy systems. Such systems are a common feature of many Tower Renewal initiatives in Europe. Tower Neighbourhood Renewal has the potential to be another component of Ontario’s climate change strategy.

Discussion
As described in Section 3.8 of this report, Apartment Towers are among the most wasteful housing types, and collectively are responsible for upwards of two megatonnes of GHGs on an annual basis for building operation alone. However, Apartment Towers are well suited for refurbishment and, in other jurisdictions, they have been upgraded to become model green buildings, with GHG output reduced by more than 50 per cent. Furthermore, Tower Neighbourhoods provide the framework for low-carbon growth.

The high GHG output of Apartment Towers is generally linked to the poor performance of the building envelope, paired with aging mechanical systems. Built before the growing concern for energy conservation, or the widespread application of building science, current energy use for building operation is considerably higher than the requirements for new construction, let alone best practice green building. Refurbishment has the potential to significantly reduce natural gas, electricity and

Refurbish or Replace?

The primary premise of Tower Neighbourhood Renewal is to view the region’s legacy of apartment towers as an asset. This view is reiterated by the successful approaches to renewal found internationally, as well as the local studies cited throughout this report.

Refurbishment is preferable to replacement from cost, environmental and social perspectives. From a cost perspective, refurbishment can be conducted at less than 1/2 to 1/5th the cost of demolition and reconstruction of the same number of units, depending on the scope of renewal work. This is based on per unit cost of refurbishment estimate found in Section 6.1, and a conservative estimate for the cost of demolition and new construction, at approximately $250 per square foot. Furthermore, Apartment Towers are generally revenue generating assets for owners, making demolition even less attractive.

From an environmental perspective, Apartment Towers from this era contain significant embodied energy within their concrete slab construction. Demolition and replacement of the same number of units would be a significantly energy intensive process. From a social perspective, demolition and replacement threatens or completely removes social networks, and significantly disrupts members of the community during the process of reconstruction. Refurbishment can modernize existing housing with relatively minimal disruption and displacement, building upon existing communities, and maintaining the existing housing stock.

Though certain cases may require demolition due to poor state of repair, from the perspective of the research team renewal is the preferred option. However, as these buildings continue to age, the cost and complexity of refurbishment may increase.
water consumption within the region’s 1,925 Apartment Towers, as well as improve air quality through a reduction in GHGs.

Recent studies that have examined the local situation, including Tower Renewal Guidelines (John H. Daniels Faculty of Architecture, Landscape and Design, University of Toronto, CMHC, 2009) and Tower Renewal Pilot Community Energy Plans (Arup, City of Toronto, 2010), have determined refurbishment can achieve environmental best practices in building performance in Apartment Towers, and that refurbishment is preferable, from both a cost-benefit and social perspective, to demolition and reconstruction.*

As large buildings housing several hundred households, the green refurbishment of Apartment Towers offers many efficiencies compared to the retrofit of the equivalent number of single family homes. In addition, the dense clusters of Apartment Towers that are common throughout the GGH provide opportunities for using distributed clean energy and district heating and cooling systems, as well as establishing local resource networks for composting, community gardening, or, as in the case of Scandinavia, using sewage for biomass heat generation. This comprehensive approach to retrofit may also result in additional carbon saving from reduced trucking to landfill, reduced municipal pumping of water, and reduced production of energy on a per capita basis.

Internationally, Apartment Tower refurbishment has become common practice as a means of extending the life of this important building stock, while at the same time significantly reducing GHG emissions. Moreover, integration of district systems and green construction practices has made several existing tower neighbourhoods centres of low-carbon growth.** In particular, Germany, The Netherlands, Scandinavia and the United Kingdom have established extensive programs that pair tower refurbishment with site diversification and sustainable new construction to accommodate growth, improve existing neighbourhoods and establish low-carbon communities.

Additional opportunities for GHG reduction can be found in transportation. Currently, 31 per cent of GHGs in Ontario are produced by transportation – 75 per cent of which is a result of gas powered vehicles. Apartment Tower clusters provide the opportunity to reduce auto-dependence through the introduction of rapid transit, as well as the introduction of diversified uses that provide daily conveniences currently only accessible by vehicle.

The environmental refurbishment and green construction associated with Tower Neighbourhood Renewal represents a significant opportunity for growing the green economy, including trade, manufacturing and innovations jobs. With nearly 2,000 Apartment Towers throughout the GGH, in addition to large clusters in Ottawa, London and other Ontario municipalities, Tower Neighbourhood Renewal represents a potentially significant market for the green economy and related industries.

While products and processes related to Tower Neighbourhood Renewal exist internationally, specifically in the European Union, there currently are several capacity gaps in the Ontario marketplace related to home-grown solutions. There is an opportunity to address these gaps by developing processes appropriate to the Canadian context and fostering locally-produced products and expertise that could make Ontario a laboratory for sustainable innovation, and create significant new employment.
Taking A Closer Look - Large Cluster Analysis

While environmental retrofit and refurbishment is likely to result in significant energy efficiency improvements in any of the Apartment Towers, some Apartment Tower Neighbourhoods may contain characteristics particularly well suited for carbon reduction.

In determining these areas, two initial investigations were conducted. The first identified Apartment Towers within 500 metres of large energy producers, which may provide the potential for the establishment of district energy.

The map on page 79 (opposite) identifies the relationship of Apartment Towers and large energy producers. Forty per cent of Apartment Towers are within 500 metres of large energy users such as hospitals, shopping centres, or industrial areas. Fifteen per cent of these are within 500 metres of two or more large energy users. Large energy users such as these are essential partners for supporting the viability of district energy projects that service nearby residential users. Further study is required to determine true district energy viability.

The second investigation identified specific towers that contained characteristics that would suggest a particularly high potential for GHG reduction. Areas with clusters of Apartment Towers have higher potential because of the economies of scale that can be achieved in retrofitting multiple buildings. Similarly, taller Apartment Towers would be expected to have higher potential for cost-effective improvement.

The time of construction also may be a factor. Recent studies suggest that buildings developed prior to the 1973 energy crisis may be better candidates for refurbishment due to the more robust construction methods that were used after 1973, in response to the crisis.*

The series of maps beginning on page 80 show locations in the GGH where these factors all come together: clusters of five or more Apartment Towers that collectively contain 1,000 or more units, contain at least one larger building (18 storeys or more) and have a majority of towers that were constructed prior to 1973. Together, these represent about half of all towers in the GGH (47 per cent).

Determining the specific opportunities for GHG reduction within individual Apartment Tower Neighbourhoods will require site by site investigation.

Variations in Construction

*Throughout the post-war era, no actual building regulations were implemented to mandate minimum energy performance for multiple residential buildings. Rather, variation in building construction and performance were a result of the specific intentions of building developers. Recent studies, including Arup’s Community Energy Plans for the Toronto Tower Renewal Office, have indicated that building construction trends towards higher insulation values and better performance towards the close of the housing boom in the mid-1970s, roughly aligning with the 1973 energy crisis. These finding are based on a limited data set, and further study is required to better understand variations in construction method and performance.

Modern Heritage

The Apartment Towers under study share a consistent architectural style, and are clear expressions of the post-war modernism and mass housing that shaped cities around the world. New technologies at the time in concrete construction allowed for buildings that were structurally expressive, with clearly defined materials. As a result, one of the current liabilities of these buildings are also one of their aesthetic strengths – exposed slab and sheer walls. Although seemingly homogeneous, they contain subtle noteworthy variations, and some, such as the towers of Uno Prii, are local landmarks listed on the inventory of Toronto’s heritage properties. As a result, careful consideration will need to be put into their refurbishment.

Images

01) Uno Prii’s Jane-Exbury Towers in the former Borough of North York are listed Heritage Buildings
02) Diagram, Intersection of Apartment Cluster and Natural Systems in the GGH, Creating Opportunities for Integrated Sustainable Systems
Greater Golden Horseshoe

**Legend**

- Apartment Clusters within 500 m of Large Energy User
- All Other Apartment Towers
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government. Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”. Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (ROW).

**District Energy**

Forty per cent of Apartment Towers are within 500 metres of large energy users such as hospitals, shopping centres, or industrial areas. Fifteen per cent of these, are within 500 metres of two or more large energy users.
Large Apartment Clusters and GHG Reduction

This map illustrates clusters of five or more towers that may have higher potential for GHG reduction: groupings of larger buildings built prior to the period in which energy saving measures began to be introduced (roughly 1973). Together, these represent about half of all Apartment Towers in the GGH (47 per cent).

Legend

- Higher Potential GHG Reduction Cluster
- All Other Apartment Towers
- Planned Metrolinx Light Rail / Bus Rapid Transit (RT)*
- Existing and Planned TTC Subway/RT
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Boundary of Jurisdictions within
- Roadway

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government. Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.” Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
Opportunities 4.3  Tower Neighbourhood Renewal in the Greater Golden Horseshoe

01) Simcoe County  02) Niagara Region  03) City of Peterborough

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team's interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network".

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).

Legend
- Higher Potential GHG Reduction Cluster
- All Other Apartment Towers
- Planned Metrolinx Light Rail / Bus RT*
- Existing and Planned TTC Subway/RT
- Planned K/W Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within

20km
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Greater Golden Horseshoe

Legend

- **High and Very High Social Need Cluster**
- **Designated Greenbelt Area**
- **Roadway**
- **Boundary of Jurisdictions within**
- **Planned transit** refers to the Metrolinx 25-Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network: Kitchener/Waterloo Light Rail” alignment provided by the Region of Waterloo (TBC).
European Best Practices in Supporting Greenhouse Gas Reduction

A range of strategies have been implemented in European Apartment Tower Neighbourhoods to significantly cut GHGs through lowered building energy use and the use of renewables. Additionally, European examples of infill development and the associated improvement of open spaces, walking and bicycling networks and transit connections also have an impact on the reduction of transportation-related GHG emissions.

The following are a series of strategies related to achieving carbon reductions within Apartment Tower Neighbourhoods, and the pictures on the following page illustrate several examples.

Introducing Renewable Energy Sources

The application of renewable energy sources is a key strategy for GHG reduction. In Marzahn Berlin, photovoltaic arrays have been added to Apartment Tower facades (image 02) and onto the roofs of buildings in the Bijlmermeer in Amsterdam. Solar water pre-heating systems are part of the renewal of towers in Gardsten in Alingsas, Sweden (06). The Gardsten project was part of a solar house initiative, where significant GHG reduction was achieved through passive heating and solar renewables. Additional energy is supplied to the Gardsten project via a local wind turbine.

District Heating

District systems are commonly applied to produce heat and energy for Apartment Tower clusters in the European Union. The energy sources for district systems range from residual heat from adjacent industrial processes, to power stations, biomass and waste incineration for co-generation. In many tower neighbourhoods, such as Amsterdam’s Bijlmermeer, all space and water heating needs are provided through district systems fuelled through renewable processes. A similar system is used in Berlin’s Schulze-Boysen-Straße neighbourhood (07).

Re-cladding

New over-cladding systems are applied onto existing towers throughout Europe to improve envelope performance and heating and cooling efficiency (01, 05). An Apartment Tower in Manchester, known as the Three Sister’s Project (04), illustrates how re-cladding for insulation purposes is often part of a broader façade renewal that improves the look of the building, while also installing new windows to improve interior environments. A wide range of over-cladding options exist that can dramatically affect building appearance as well.

PassivHaus

Apartment Towers in northern Europe have been retrofitted to the Passivhaus standard, creating carbon neutral buildings, requiring little to no heating systems due to robust envelope and heat recovery systems. Image 10 is a sample wall section of a heavily insulated wall in Alingsas, Sweden.

Enclosed Balconies

Balcony treatments in renewal projects remove thermal bridging through improvements to the building envelope. These vary from open to enclosed. In Berlin’s Markisches Viertel, balconies have remained open, with insulation wrapped around slab edges (03). In Gardsten Göteborg, south-facing balconies have been enclosed to enable passive solar gain, while providing new solariums that are inhabitable year round (06). Through operable windows, the solariums have access to the outdoors in warmer months.

Waste Management

Numerous innovative waste management strategies are being introduced in Apartment Tower Neighbourhoods throughout Europe, with the aim of improving diversion rates, as well as using waste as a resource such as bio-fuel (14), compost and heat used in district systems.

General Refurbishment

In Berlin, an aggressive program of Apartment Tower refurbishment has been underway since German unification in the 1990s. Four main strategies have been used to achieve low-carbon buildings, such as the Schulze-Boysen-Straße tower (see section 6.1 and image 07). These include:

• providing well-insulated and continuous barriers between interior and exterior environments;
• recovering waste heat from ventilation and hot water;
• providing heating, cooling and energy from a district system, preferably one powered by renewables; and
• educating and empowering tenants with the knowledge they need to optimally live in their unit, and the means to track their individual energy use.

Image

Green Tower Refurbishment, (Manchester, UK)
European Best Practice

Greenhouse Gas reduction strategies

01) Thermal Recladding, Gropiusstad, Berlin, Germany
02) PV Solar energy in Marzahn, Berlin, Germany
03) Balcony upgrade and high efficiency appliances, Markisches Viertel, Berlin, Germany
04) Facade re-cladding, Manchester, UK
05) Balcony re-cladding - Marzahn, Berlin, Germany
06) Solar Thermal heating and enclosed balconies in Gardsten, Göteborg, Sweden
07) Low-energy towers, Schulze-Boysen-Straße, Berlin, Germany
08) Community waste sorting facility, Backa Rod, Göteborg, Sweden
09) Refurbished Towers in Marzahn, Berlin, Germany
10) Wall insulation sample for PassivHaus conversion of Apartment building, Alingsas, Sweden
11-12) Underground vacuum waste management system in Hammarby Sjostad, Stockholm, Sweden
13) Organic waste composting (inside community waste sorting facility shown in 08)
14) Bio-gas fuel pumping station, Trollhattan, Sweden
4.4

Supporting the Creation of Complete Communities Through Mixed-Use Infill and Intensification

Context
Ontario adopted the Growth Plan for the Greater Golden Horseshoe in June 2006. The Growth Plan calls for the creation of more compact and complete communities with an emphasis on infill and intensification within existing urban areas. It is part of a suite of new provincial policies adopted in the past five years – including the 2005 Provincial Policy Statement and the Greenbelt Plan – that collectively seek to better manage growth and development in the region.

Among the Growth Plan’s key policy directions are the following:
• accommodating at least 40 per cent of future residential development through intensification;
• reducing dependence on the automobile through the development of mixed-use, transit-supportive, pedestrian-friendly urban environments;
• encouraging the development of complete communities; and
• planning urban growth centres as focal areas for investment and for population and employment growth.

Municipalities across the region are currently in the process of developing and implementing Official Plan policies and strategies to implement the Growth Plan. This includes developing local intensification strategies that identify appropriate forms and locations for intensification. Tower Neighbourhood Renewal, through the thoughtful intensification of apartment clusters, can provide an important opportunity to support these local Growth Plan implementation efforts.

Discussion
For the most part, municipal intensification strategies being developed pursuant to the Growth Plan have focussed on identifying intensification opportunities such as brownfields, greyfields, vacant lands, and underused commercial areas along major arterial roads. Apartment Tower Neighbourhoods are generally not being examined as potential areas for intensification. Yet, as was discussed earlier, these sites often sit on large, underused parcels of land. Forty-seven per cent of Apartment Tower parcels in the GGH are greater than one hectare, and many of these parcels are clustered. The total land resource in the GGH on which Apartment Towers are situated is 2,197.5 hectares. If the Growth Plan’s minimum greenfield density target of 50 people and jobs combined per gross hectare were applied to this land area, it would accommodate more than 100,000 people and jobs (detailed study is required on a site specific basis to determine realistic scenarios that take into account local conditions).

Not only is there significant land associated with Apartment Towers, but many of them are located in parts of municipalities that have high potential for intensification. Fourteen per cent of Apartment Towers are located within urban growth centres, which are identified in the Growth Plan as key locations for intensification. Fifty-five per cent are located along arterial roads, which the Growth Plan identifies as potential intensification corridors. There is also a strong correlation between Apartment Towers and shopping centres. Forty-three per cent of Apartment Tow-
ers are located within 500 metres of shopping centres. Most shopping centres have large tracts of surface parking which are frequently identified in municipal intensification strategies as potential areas for infill or redevelopment.

The combination of large, underused parcels located in areas that are prime for intensification suggests that Apartment Towers could be considered as potential intensification areas, particularly after the "low hanging fruit" of brownfields, greyfields and vacant sites begin to redevelop.

Thoughtful and appropriate mixed-use growth within these sites can also contribute to the complete community and placemaking goals of the Growth Plan. Apartment Tower Neighbourhoods are often isolated, with relatively poor access to key community services, employment, cultural facilities and shopping opportunities. Mixed-use growth, as well as the community development strategies discussed in Section 4.2, provide an opportunity to introduce these types of amenities, particularly in areas identified for future regional rapid transit, as outlined in Section 4.1.

However, it is important to note that the surrounding urban context of Apartment Tower Neighbourhoods is highly varied, and would suggest caution in determining which Apartment Tower Neighbourhoods are appropriate for intensification, and what form of intensification would be appropriate. Many Apartment Tower Neighbourhoods were originally developed as part of master planned communities with a mix of housing types. Seventy eight per cent of towers are within 150 metres of existing single-detached housing and 48 per cent are within 250 metres of newer high-rise buildings (developed since 1985). Clearly, the context of each Apartment Tower Neighbourhood would need to be considered on a case-by-case basis, but the observations from this report suggest that Apartment Tower Neighbourhoods could be looked upon as potential intensification areas that help to achieve the growth and complete community objectives of the Growth Plan.

A better understanding of how these sites could intensify, including visualizations, best practices and model official plan and zoning policies, would be a useful tool to assist municipalities to integrate Apartment Tower Neighbourhoods into local intensification strategies.

**Taking A Closer Look - Large Cluster Analysis**

Determining which Apartment Tower Neighbourhoods have intensification potential would need to be done at the site specific level, but there are a number of characteristics that could suggest a particularly high potential for intensification. Clusters of towers that sit on larger parcels would be expected to have the highest amount of land potentially available, and could allow for land assembly that would facilitate larger scale infill developments. Similarly, clusters located in urban growth centres or along key arterial corridors would also be strong candidates, given the Growth Plan's emphasis on increasing density and mix of uses in these locations. Where such clusters are near existing or proposed regional rapid transit would also be expected to have a stronger market for redevelopment.

The series of maps beginning on page 92 show locations within the GGH with clusters of five or more Apartment Towers that are either on parcels greater than one hectare in size, or are located in an urban growth centre. Together, these represent 60 per cent of Apartment Towers in the GGH.

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**Proximity of Towers to Schools**

Almost ninety per cent of Apartment Towers in the GGH are located within 500 metres of a public school. This relatively high percentage is a result of the post-war community planning that was based on the neighbourhood unit, in which low and high density housing was arranged around centrally located schools and community parks. Schools have the potential to support typical Tower Renewal initiatives such as community gardens, youth initiatives, community recreation activities and so on. The large land areas of schools also offer potential for geothermal and other district energy installations.

In Toronto, the Toronto District School Board (TDSB) has shown leadership through the establishment of the TDSB Environmental Advisory Committee. This committee is looking at opportunities for TDSB properties, such as geothermal and photo-voltaic installation, and community gardens, as well as investigating the potential role it can play in Tower Neighbourhood Renewal.
Schematic Analysis of Infill Potential for Family Housing on Apartment Tower Sites

Images
01) Typical Apartment Tower and site, with large, underused property, Etobicoke
02) Apartment Neighbourhood adjacent to community shopping centre, Ajax
03) New condominiums developed adjacent to existing Apartment Towers, Mississauga
04 - 06) Schematic introduction of townhouse and mid-rise housing on typical Apartment Tower site
07) Schematic introduction of townhouse and mid-rise housing in cluster of four apartment towers, introducing new pedestrian and cycling connections
08) New mixed-use development and public space adjacent to Apartment Tower, Port Credit
09) Visualization of infill potential, creating cohesive public space within currently fragmented Apartment Neighbourhood
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Greater Toronto and Hamilton Area, with Waterloo Region, City of Guelph, City of Brantford / Brant County, Dufferin County and Northern end of Niagara Region

Legend
- Approximate Boundary of Urban Growth Centre
- Higher Potential Growth Cluster
- All Other Apartment Towers
- Planned Metrolinx Light Rail / Bus Rapid Transit (RT)*
- Existing and Planned TTC Subway/RT
- Planned KW Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

This map illustrates clusters with high potential for intensification: large clusters of towers with properties larger than one hectare, or within an urban growth centre. Together, these represent 60 per cent of Apartment Towers in the GGH.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25 Year Plan for the Regional Rapid Transit and Highway Networks”. 3) Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
**Legend**

- Approximate Boundary of Urban Growth Centre
- Higher Potential Growth Cluster
- All Other Apartment Towers
- Planned Metrolinx Light Rail / Bus RT*
- Existing and Planned TTC Subway/RT
- Planned K/W Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within

*Planned transit refers to the Metrolinx 25 Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team's interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network".

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Greater Golden Horseshoe

Legend
- High and Very High Social Need Cluster
- All Other Apartment Towers
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within

*Planned transit refers to the Metrolinx 25-Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team's interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled "25-Year Plan for the Regional Rapid Transit and Highway Network".

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
European Best Practices in Supporting Mixed-use Growth to Foster Dynamic and Complete Communities within Apartment Tower Neighbourhoods

Across the European Union, older Apartment Tower Neighbourhoods have evolved into dynamic communities, though new residential and commercial infill developments as part of comprehensive renewal projects. Infill and intensification in tower neighbourhoods can provide a variety of housing types and tenures, new commercial amenities, community services, vibrant public spaces and employment opportunities.

The following are a series of strategies related to achieving well designed mixed-use growth within Apartment Tower Neighbourhoods, and the pictures on the following page illustrate several examples.

Introducing Shops, Service and Amenities
Numerous Apartment Tower Neighbourhoods in Europe have improved conveniences for local residents through the introduction of shops, services and amenities. Among many examples, the Chrisp Street Estate in East London integrates retail at the base of towers (01), as does a tower in Avedore, Copenhagen (04). Local vendors and farmers markets, such as the one in Marzahn, Berlin (07) are another common strategy that create local economic development opportunities, activate the public realm, and bring culturally appropriate offerings to local residents.

New Housing Types and Tenures
In Amsterdam’s Bijlmermeer neighbourhood, new market (owner and rental) and subsidized housing has been created throughout the neighbourhood in a range of building types to help encourage a healthier socio-economic mix (09 & 10). Additionally, part of the refurbishment of some Apartment Towers in the Bijlmermeer has included unit restructuring, such as the introduction of two storey family units at grade (06). New housing in low-rise, mid-rise and high-rise forms are introduced in many tower neighbourhoods in London as a means of intensifying neighbourhoods, providing greater housing choice, as well as generating revenue for wide scale neighbourhood renewal (08, 11,12).

High Quality Open Space and Public Realm
Infill development in tower neighbourhoods helps to transform large, underused and often anonymous open spaces into human-scaled, legible and vital new parks (13, 15), plazas (03, 07) and streets (09), that include space for passive and active recreation, transportation, play, markets, as well as festivals and events (04, 05).

Image
Refurbished Apartment Towers, Mid-rise infill housing and upgraded open space and in Swiss Cottage (London, UK)
European Best Practice
Mixed-use infill and intensification strategies

01) Retail amenities in the Chrisp street estate, London, UK
02-03) Retail amenities at Markisches Viertel, Berlin, Germany
04) Retail amenities in Avedore, Copenhagen, Denmark
05) Neighbourhood square in Amsterdam, NL
06) Commercial infill, Brunswick Centre, London, UK
07) Neighbourhood square and market in Marzahn, Berlin, Germany
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

08) Low-rise infill housing in Tower Hamlets, London, UK
09) Infill family rowhousing in Bijlmermeer, Amsterdam, NL
10) Infill midrise housing in Bijlmermeer, Amsterdam, NL
11) Infill family rowhousing in Camden, London, UK
12) Infill high-rise housing in Tower Hamlets, London, UK
13) Mid-Rise Infill, Tower Hamlets Community Housing, London, UK
14) Private gardens and shared outdoor space in Java Eiland, Amsterdam, NL
15) Upgraded open space in Poptahof, Delft, NL
5.0 International Case Studies

The following are best practice examples of Tower Neighbourhood Renewal in the European Union (EU). Research was undertaken in a series of site visits by the research team between 2005 and 2009.

5.1 – The Bijlmermeer, Amsterdam, The Netherlands
5.2 – The Framtiden Company, Göteborg, Sweden
5.3 – The Kvarterloeft Initiative, Copenhagen, Denmark
History
A massive experiment in post war public housing, the Bijlmermeer consisted of 31 eleven storey high-rise blocks set in a honeycomb pattern in a large park landscape. The neighbourhood was constructed between 1967 and 1975 as a response to the enormous middle class housing shortage in Amsterdam. The middle class didn’t arrive as planned, and instead, the Bijlmermeer attracted those with no other options. Over time, the Bijlmermeer became “a single-class, low-income and unemployed, ethnically diverse and increasingly non-white urban enclave” (B&H, 1993). The neighbourhood continues to serve as an entry point for newcomers, and is home to a mosaic of residents from over 30 different countries (B&H, 1993). The physical design of the neighbourhood has contributed to the crime, poverty and tenant dissatisfaction that the neighbourhood has experienced over its 40-year history (B&H, 1993). The original plans were not fully realized due to financial issues, which meant that stores and recreational facilities were not built, and the planned metro link to central Amsterdam did not occur until the 1980’s (H&W, 2003). Oscar Newman visited in 1972 and blamed the neighbourhood’s degradation, vandalism, and lack of safety on the many ‘indefensible’ spaces that he observed (H&W, 2003).

Integrated Renewal
By the early 1990s, aging buildings, corporate financial problems, crime, poverty, and tenant dissatisfaction were major issues in the neighbourhood (B&H, 1993). Since then, the Bijlmermeer has become a laboratory for testing out innovative renewal strategies to address these issues. Importantly, the renewal program has focused on addressing the roots of social problems in combination with physical restructuring, and has been driven by community engagement.

Physical Restructuring
The Bijlmermeer’s renewal has meant converting what had been a homogenous neighbourhood of high-rise
blocks into a mixed neighbourhood that offers a diversity of residential, business, recreation and shopping functions. To address the issue of concentrated poverty, renewal has included the demolition of half of the existing high rise flats, and the introduction of low-rise rental apartments and owner occupied single family dwellings (H&W, 2003). A mix of housing is intended to attract new, more affluent groups, and to provide existing residents with the opportunity to move around within the neighbourhood as their needs and desires change over time (H&W, 2003). Additionally, infill housing has been successful at breaking up and humanizing the scale of the original towers, and creating a range of safer and more active public, semipublic, and private outdoor spaces.

**Building Renewal**

The Apartment Towers that have been retained have been renovated to introduce mixed uses on the ground floors, improve waste management systems, energy use sub metering systems, district heating connections, renewable energy measures, as well as improved architectural finishes.

**References**


Framtiden

Forvaltnings AB Framtiden is a consortium of public companies responsible for the provision of market-based affordable housing in the City of Göteborg (Göteborg) Sweden. Framtiden owns and operates over 70,000 units of housing.

Framtiden operates as a private company, and maintains its housing stock and programs through self generated revenue streams. Through subsidiary companies such as the parking authority, the development of new high end market housing for sale, and the general rental income generated through its existing housing stock, Framtiden generates financing to invest in the modernization of its older housing stock, most of which dates from the 1960s and 1970s during Sweden’s ‘Million Homes Program’. A considerable portion of it’s rental stock is kept at the affordability threshold, a rate negotiated with Sweden’s Tenant Organization. Housing for those in need is provided by Framtiden, with a rent subsidy provided by the Swedish Government. Recent reinvestment projects are consistent with the aims of Tower Neighbourhood Renewal, including green refurbishment, facilities upgrade, open space improvements and community programming, as well as the development of new units within older communities.

Case: Gardsten Solar House

Gardsten was built in the early 1970s as part of the national ‘Million Homes Program’, on the periphery of Göteborg. By 1997 many of the neighbourhood’s 2000 apartments were vacant. At this time, a subsidiary company of Framtiden called Gardstensbostader was formed to undertake the comprehensive social and environmental renewal of the neighbourhood. Among the many projects that have transformed the neighbourhood, the award winning ‘Solar House’ project is an example of high-quality building refurbishment undertaken in a northern climate that improves energy and social conditions.

Environmental Sustainability

On the west side of Gardsten, the solar house project has transformed a series of three and six storey apartment blocks that are organized around shared courtyards. The refurbished buildings feature a new highly insulated building envelope, are connected to a district heating system, have solar panels on the roof that heat domestic
hot water, feature enclosed balconies that reduce heat loss and increase the livable space of each unit, and feature new energy efficient appliances. Prior to renewal, utility costs were incorporated into tenant’s rent, and consequently there was little incentive to conserve. Following the renovations, space heating, water, and electricity use is now metered separately for each unit, and tenants who conserve receive a rebate on their monthly rent. Between building upgrades and improved tenant conservation, building operating costs have been reduced by 45 per cent. As both an environmental and social strategy, ground floor spaces were turned into community amenities that include laundry facilities and greenhouses with composting equipment that transforms household organic waste into rich soil for gardening.

Social Initiatives
Eighty three per cent of Gardsten residents are of non-Swedish origin, and prior to renewal efforts, the area suffered from high unemployment rates and stigmatization within the city of Göteborg. During the neighbourhood’s renewal, Gardstensbostader was able to create 870 new jobs for Gardsten residents, many of them related to the building and landscape renovation work undertaken. Youth programs focussed on the renovation of neighbourhood green spaces, and new recreational programs were created. In 2005, ‘The New Face of the Million Programme’ exhibition brought a lot of positive attention to Gardsten from the rest of the city of Göteborg. This exhibit led to the feeling that Gardsten was now recognized as a living and vital part of the city and was an important symbolic moment to Gardsten residents.

References
The Enhanced Social Structure of Gardsten and Solar buildings in Gardsten (published by Gardstensbostader).
5.3 The Kvarterløft Initiative

Denmark

History
Between 1997 and 2007, the Kvarterløft Initiative, which translates to ‘integrated urban regeneration’, has had a great deal of success in positively transforming a number of 1960s era public housing estates in Denmark. A federal program led by the Ministry of Refugee, Immigration and Integration Affairs, Kvarterløft projects were undertaken in neighbourhoods that tended to have large new immigrant populations, and that were growing increasingly socially, culturally and economically segregated from mainstream Danish society. A total of 12 neighbourhoods housing approximately 110,000 residents took part in the program, which conceptualized each neighbourhood as a distinct ‘urban regeneration laboratory’, where a set of coordinated projects were designed and implemented through a cooperative process. While each neighbourhood had a different set of specific issues and goals, at its core, the program’s central objective was to address the roots of social and economic decline in troubled areas, and to build a more equitable and integrated society.

Renewal Process
The Kvarterløft model stresses citizen involvement, integrated solutions, and public private partnerships. In order to reach the most isolated and exposed groups of residents, including ethnic minority groups, the process is approached in three-steps: participation, interaction and then integration.

Institutional Structure
The Kvarterløft projects required that various agencies at different levels of government work together effectively. In each Kvarterløft neighbourhood, a local secretariat was established and tasked with finding and coordinating solutions that would work locally.

Branding
The Kvarterløft model recognizes that combating stigmatization is a difficult and long term process. In order to
gradually change a neighbourhood’s negative image, a long term branding strategy needs to be developed that celebrates and communicates positive changes to a local and regional audience. Through websites, newsletters and neighbourhood magazines, many of the Kvarterløft projects engage locals in creating their own media in order to celebrate local success stories, encourage neighbourhood social organization, and to build local identity and pride. Some Kvarterløft neighbourhoods have stressed the use of signage and advertisements, issuing press releases to attract mainstream media coverage, and some have organized large cultural events to communicate positive stories about their neighbourhood. Physical renovation work that renews housing, courtyard environments and the neighbourhood landscape also has had a large impact on neighbourhood rebranding.

**Project Highlights**

Kvarterløft projects in the tower districts of Norrebro Park, Avedore and Brondby Strand in and around Copenhagen offer inspiration and lessons to Tower Neighbourhood Renewal efforts in the GGH.

**Lessons**

The experience from the Kvarterløft initiative suggests that for Apartment Tower Neighbourhood Renewal to address the roots of socio-economic segregation, and to bring long term positive change in the lives of local residents:

- the renewal program must be of a significant scope to have an impact;
- renewal measures must be comprehensive, including physical and social investments; and
- renewal must be understood as a long term process.

**Where earlier urban restructuring projects in Denmark were met with conflict and criticism, the Kvarterløft initiative has largely been evaluated positively, and has garnered a great deal of international interest. The initiative has been the subject of numerous academic publications and conferences, and individual projects have won prestigious design and planning awards. As a model, what started out as a series of pilot projects has grown to influence mainstream Danish urban renewal and social housing legislation.**

**References**


**Images**

01) New path and improved natural open space
02) Renewed towers and courtyards in Norrebro Park, Copenhagen
03) New shops and markets at base of towers
04) Overview image of neighbourhood
05) Well used Norrebro Park has been updated with new bicycle paths and improved open spaces and has become the heart of the renewed neighbourhood
06) Program book of 10 year anniversary of initiative
07) Youth sports programs in Brondby Strand, Copenhagen
08 - 09) New lighting and amenities along Prags Blvd in Holmbladsgade, Copenhagen
6.0

The Challenges of Implementing Tower Neighbourhood Renewal in the Greater Golden Horseshoe

Taking advantage of the opportunities of Tower Neighbourhood Renewal will require a coordinated and integrated approach. The following section outlines areas where further investigation may be required in developing a comprehensive Tower Neighbourhood Renewal strategy in the Greater Golden Horseshoe (GGH).
6.1
Financing Renewal

Overview
Recent local and international studies have placed the cost of green refurbishment of Apartment Towers in the range of $25,000 - $45,000 per unit.* These figures reflect a wide range of refurbishment strategies, from only energy measures in the low end, to comprehensive refurbishment, including a degree of unit and common space modernization at the high end.

Additional costs would be associated with site renewal and community development, as well as the introduction of green infrastructure, such as district heating/cooling, distributed energy systems, or alternative forms of waste management.

As a result, building and site refurbishment are capital heavy projects.

Renewal Financing Precedents
The European Union (EU) case studies explored earlier in this report offer some potential precedents for financing Tower Neighbourhood Renewal.

In the Schulze-Boysen-Straße low energy tower in Berlin (see section 4.3), financing was arranged by the housing company HOGOWE through partnership with the City of Berlin, and low interest loans from the German National Economic, Social and Ecological Development Bank known as KFW.

Also in Germany, project financing has been achieved through private lenders, as in the case of Berlin’s Markisches Viertel, owned by the Public Housing company GESOBAU. GESOBAU secured private loans through rent increases that provided a guaranteed revenue stream. Rent increases were then offset by energy savings, resulting in a net zero or marginal rent increase for tenants, with significant improvements to housing quality through suite modernization and site upgrade along with green refurbishments. The Markisches Viertel neighbourhood contains a wide range of income groups, and the economically vulnerable were protected through rent subsidy.

In the United Kingdom (UK), the Homes and Communities Agency (HCA), the Government’s National Housing and Regeneration Agency, is a finance partner in housing and regeneration projects throughout the UK. With an annual budget of £5 billion, the HCA provides gap financing in the form of low interest loans, generally in the range of 20 per cent of the cost of a renewal scheme, to augment private financing. The HCA will work with project stakeholders to establish a development agreement that ensures best practice in the social, environmental and ecological spheres. The HCA has been an active partner in the majority of UK Tower Renewal projects discussed elsewhere in this report, such as the Crossway, Swiss Cottage, and Tower Hamlets Community Housing.

Throughout the EU, though particularly in the UK, the development of surplus land has been used to create revenue streams for renewal. In these cases, lands within Apartment Tower Neighbourhoods, generally run by not-for profit housing associations, are developed as market housing. The revenue from the new development helps to finance renewal of the existing Apartment Towers, as well as the development of community amenities that benefit both existing and new residents. In most cases, a portion of the new housing is also dedicated to social housing, and often another portion to intermediate housing – a form of affordable home ownership. In these schemes, the location and general site planning of the new projects is negotiated with the housing association as well as tenant groups, such as the location of new paths, public spaces, and amenities, with the goal of creating a refurbished and better organized district.

Cost of Renewal
*The Tower Renewal Guidelines (John H. Daniels Faculty of Architecture, Landscape and Design, University of Toronto, CMHC, 2009) place the most comprehensive renewal option at $32,250 per unit. The City of Toronto’s Tower Renewal Community Energy Plans (Arup, 2010) place comprehensive renewal, with related measures, at $27,300 per unit. The UK study, Roadmap to 60%, Eco-Refurbishment of 1960’s Flats (2008), places higher level refurbishment measures at £17,900 ($27,500) per unit. Berlin’s Schulze-Boysen-Straße low energy tower, the most comprehensive of these examples including a degree of suite modernization and site renewal, places costs at €32 600, ($43, 700) per unit. These are approximate figures and relate to a limited number of studies. Of these, the only built example is the Schulze-Boysen-Straße low energy tower. A pilot project may be required to better understand the costs of refurbishment in the local context. Green refurbishment paired with full unit refurbishment would increase per unit costs.

PACE Bonds (United States)
**Property Assessment Clean Energy (PACE) Bonds, where the proceeds are lent to property owners for the purpose of financing environmental refurbishment and are repaid over a fixed period, for example twenty years, through an annual assessment on their property tax bill. PACE bonds are increasingly common in the US where they are issued by municipalities.
Some financing schemes involve a change in tenure of existing buildings. Policy in the UK promotes the building of purpose-built housing for families living in tower blocks. An example is the Crossways in East London, an estate consisting of three large towers that were refurbished. Here, new terrace housing was built at the base of the existing Apartment Towers, and families living in the towers were given the option to relocate into the new housing. The remaining tenants within the three towers were consolidated into two towers, with the third tower converted to higher end housing for sale. The revenue from the units within the third tower, as well as additional terrace housing at-grade, financed the refurbishment of the existing buildings as well as the upgrade of community facilities and general site renewal.

**Local Context**

The Ontario context provides specific opportunities and challenges for financing compared to the European precedents discussed above. In Ontario, the most striking difference from Western Europe is that the majority of Apartment Towers are in private ownership. Specific statistics on public versus private ownership of GGH Apartment Towers were not available for this study; however, in Toronto, approximately 85 per cent of Apartment Towers are in private ownership.

Furthermore, ownership in the GGH is highly diversified among a wide range of owner groups of varying size and sophistication, which results in great variation in the ability to leverage financing.

As an additional complication, individual buildings within Apartment Tower clusters are often under different ownership. As a result, renewal of these sites would require the cooperation and coordination of multiple building owners, each with specific abilities and levels of interest.

An additional local variation is the cost of energy. The low cost of energy in Ontario, specifically natural gas, changes the pay-back profile of retrofit compared to European counterparts, as does the lack of a carbon tax. A further complication is access to upfront capital for financing renewal projects. Currently, private lenders are unlikely to finance renewal projects in isolation, and government programs have yet to aggressively target the Apartment Tower stock.

It is apparent that the financing of renewal projects in Ontario will require a variety of approaches. As in the international cases, successful financing might require the coordination of public and private funders and multiple stakeholder cooperations. The establishment of finance options will require further investigation into the pro-forma of achieving Tower Neighbourhood Renewal objectives in the Ontario context. Specifically, further study is required to determine the following:

- role of private lenders, utilities, pension funds and other investment funds in financing Tower Neighbourhood Renewal;
- role of governments at all levels in guaranteeing long term loans of private lenders;
- potential for intensification to generate revenue streams for building and site refurbishment;
- role of governments at all levels in providing gap financing to augment private lenders;
- role of bonds such as Property Assessment Clean Energy Bonds** in financing individual projects;
- circumstances under which governments could act as sole provider of low-interest loans for renewal;
- the potential for funding through a Greenhouse Gas Reduction special purpose account related to the Province’s Cap and Trade system - currently under development;
- role of public housing in initiating and financing renewal.

Currently, the rehabilitation of public housing is a priority for all levels of govern-
ment, and is being implemented through programs such as Infrastructure Ontario’s Affordable Housing Loan Program among others. There is an opportunity to focus this funding on projects that meet the objectives of Tower Neighbourhood Renewal, such as green refurbishment and social investment. There is also an opportunity to determine the conditions in which these existing funds or new financing tools could begin to provide private affordable housing with refurbishment capital. The City of Toronto’s Tower Renewal Financing Corporation, currently under development, is one potential step.

With nearly 2,000 Apartment Towers in the GGH, the economic, social and environmental impact of Tower Neighbourhood Renewal can be significant. Investigations into sustainable methods of financing is a key next step.

6.2

Land Use Planning Policy Framework for Tower Neighbourhood Renewal

Research related to successful renewal in the EU indicates that optimum results were achieved where clusters of buildings were involved, and renewal was coordinated at the neighbourhood level to create vibrant, sustainable and connected neighbourhoods. The most successful examples brought together:

- comprehensive neighbourhood planning;
- coordinated public and private investments; and
- long term management strategies.

In the GGH, 63 per cent of identified towers are in clusters of five or more, providing significant opportunity for such coordination. It is in these clusters of towers, home to thousands, where gains can be made in achieving complete, connected and low-carbon communities; and where district energy systems, open space networks, and thoughtful infill housing can be introduced. However, there are challenges in the Ontario context.

Currently, policies are unclear in regard to the coordinated renewal of Apartment Tower Neighbourhoods. For example, the single-use zoning that exists on the majority of Apartment Tower sites is an obstacle to many of the community and economic objectives of Tower Neighbourhood Renewal, such as introducing small-scale commercial activity, community services, or additional site development.

Another challenge is fragmented ownership. Often buildings within Apartment Tower clusters are owned by a range of private rental companies and, to a lesser extent, public housing and not-for-profits. This situation has tended to occur over time, with developments generally built by one owner, and eventually fragmenting through sale of individual buildings. Fragmentation of ownership is often paralleled with physical fragmentation. Tower clusters that were originally conceived of as a single neighbourhood unit have become divided and separated over time with fencing and other barriers. What is missing in Ontario is a policy framework to encourage coordinated renewal involving multiple owners. As an initial step, further research is required to determine the ownership breakdown of the Apartment Tower stock in the GGH, in order to begin to develop a framework for collaborative reinvestment.

Apartment Tower Neighbourhoods contain significant open space and, as noted in Section 3.4, 57 per cent of towers are directly adjacent to another Apartment Tower property, creating significantly large land areas for reinvestment and reconsideration. What is currently lacking is a means of evaluating this land resource,
to determine which areas of land should be maintained as open space, natural areas, pathways to transit, connections to adjacent properties, and so on, and which areas of land are appropriate for new mixed-use development.

**Enabling Appropriate Mixed-Use Development**
Building on the research in this report, a key next step may be an in-depth study of land use capacity within Apartment Tower clusters, which would include establishing a typological breakdown of clusters related to physical and demographic characteristics as well as location within the region, in order to better understand effective strategies for renewal.

Further study is also required to determine the appropriate land use planning policy framework for the implementation of Tower Neighbourhood Renewal that would address:

- coordination of planning across multiple Apartment Tower properties and multiple stakeholders to engage in the full scope of Tower Neighbourhood Renewal;
- mechanisms to ensure views and aspirations of residents of Apartment Tower Neighbourhoods steer the development of renewal strategies;
- the means of assessing appropriate levels of mixed-use intensification;
- appropriate design guidelines for infill development and Tower refurbishment;
- green standards for new construction within Tower Neighbourhood Renewal sites;
- infrastructure needs and capacities;
- ensuring social and community development objectives of renewal are met; and
- long term management strategies for Apartment Tower sites following Tower Neighbourhood Renewal.

**Supporting Social and Economic Development**
Another key aspect of Tower Neighbourhood Renewal that has implications for land use planning policy is encouraging local economic and community development and access to services through the introduction of new uses in Apartment Tower Neighbourhoods. In addition to current zoning restrictions, related challenges include attracting needed services into Apartment Tower Neighbourhoods, such as community health centres, as well as how to provide residents with the tools to participate and prosper in an entrepreneurial, community development and social enterprising endeavour.

In this regard, further study is required to determine:

- how to provide micro financing for small business development within Apartment Tower Neighbourhoods;
- approaches to overcoming barriers to land-use diversification within Apartment Tower Neighbourhoods, such as the conversion of the ground floors of towers for use by small scale commercial enterprises and not-for-profits, as well as the introduction of kiosk retail, seasonal markets, and varying degrees of mixed-use infill developments within apartment properties;
- the means of ensuring access to community and health services within Apartment Tower Neighbourhoods through municipal programs and partnerships;
- the role of non-profit agencies in delivering community development programs, training, and access to knowledge to residents for starting an enterprise; and
- the role of community development corporations in facilitating community renewal and establishing space for community service delivery, businesses and organizations.

**Further Macro Economic Studies of Impacts of Comprehensive Tower Neighbourhood Renewal**
Further analysis should be conducted related to the economic development potential of refurbishment and mixed-use growth within Apartment Neighborhoods, including construction, both new built and retrofit, demand for green products, and new commercial activity, particularly around transit stations. Analysis should also be conducted to determine the impacts of reduced energy, water and waste costs on local spending power, and potential reductions to the long term costs of health and social services due to improved social and environmental conditions within these currently marginalized areas.
### 6.3 Maintaining Housing Affordability While Expanding Housing Choice

A key aspect of Tower Neighbourhood Renewal’s success internationally has been the improvement of the quality of housing within existing Apartment Towers, as well as the introduction of new housing and amenities within tower neighbourhoods. This raises a challenge with respect to maintaining housing equity and affordability in the face of Tower Neighbourhood Renewal. Specifically, how to ensure that economic evictions do not occur as a result of Tower Neighbourhood Renewal and that Tower Neighbourhood Renewal expands housing choice for existing Apartment Tower residents. To address these challenges, further study is required to determine:

- methods for ensuring affordability post-renewal;
- methods for minimizing tenant discomfort during the renewal process; and
- methods for ensuring that displacement does not occur as a result of renewal.

In regards to expanding housing options within Apartment Tower neighbourhoods, further study is required to determine:

- methods for expanding housing tenure options and home ownership to residents within Apartment Towers while ensuring housing equity and affordability;*
- the potential for municipalities to be empowered under the Planning Act to use inclusionary zoning in new infill developments to provide affordable housing as a component of market development; and
- the applicability of programs such as the UK’s ‘Intermediate Housing’ and ‘First Time Buyers’ Program’ in the Ontario context.**

There is an opportunity for Ontario’s Long Term Affordable Housing Strategy, currently under development, to begin to address these issues.

### 6.4 Sub-Metering

The introduction of sub-metering, wherein each household unit pays for their actual energy usage rather than a portion of the average usage of the entire building, is a key strategy for lowering energy use in Apartment Towers. It provides each household with the ability to monitor their personal energy use, and it creates an economic incentive for each household to conserve. There is a concern, however, with installing sub-metering prior to building refurbishment. Sub-metering prior to refurbishment potentially removes the incentive for the building owner to invest in green upgrades, because energy costs, and potential energy savings, are transferred to tenants.

Furthermore, the existing conditions of Apartment Towers, including poorly performing envelopes, limits the ability of residents to make individual changes related to space heating that have a significant impact on their energy use without sacrificing comfort.

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**Mixing Tenures**

*Of the many opportunities for mixing tenures within Apartment Neighbourhoods, one option includes providing a mix within individual buildings for meeting affordable housing needs. Traditionally, tenure mix has been among buildings, with condominium towers located next to affordable private rental or not-for-profit towers. Alternatively, various forms of stratified ownership could be instituted to mix tenure within buildings as part of renewal schemes. A not-for-profit housing provider could acquire ownership of certain units within a privately owned for-profit rental or condominium building and then manage the units as affordable rental housing.

**Intermediate Housing (UK)**

**In the UK, the intermediate housing program aims to provide an option for affordable home ownership. Intermediate housing is a housing tenure, often aimed at first time buyers, where the unit is co-owned by the buyer and the owner of the building, often a Housing Association, reducing the cost of entry into the housing market. Participants in the program must initially purchase a minimum 50 per cent of the unit, paying rent on the balance, with the sum of 50 per cent mortgage and rent being less than 100 per cent ownership. Owners are then given the ability to purchase the full 100 per cent over a future timeline. Part ownership can also be sold in the housing market. Participants in the program must meet certain criteria, such as having a family income at or below £60,000. New housing projects generally contain a requirement to include a percentage of Intermediate Housing units. The Intermediate Housing, and First Time Buyers’ Program is administered through the Homes and Communities Agency.*
Installing sub-metering post-refurbishment can ensure optimum performance, and provide the knowledge and incentives for tenants to control energy use within a modernized, thermally efficient and comfortable apartment.

6.5 Private Ownership and High Social Need

Apartment Towers currently play a vital role of providing several hundred thousand units of private, affordable rental housing throughout the region, often housing those in great need. However, affordability in market housing is generally related to the desirability of the housing on offer. In the case of Apartment Towers, lower rental costs are often a function of an isolated location, a lack of conveniences and services, or in certain cases, deteriorating housing quality.

Primarily developed and marketed to middle income tenants in the 1960s and 1970s, much of this housing stock was not designed to address the needs of current tenant groups.

As a result, a considerable challenge in the Ontario context is the high degree of social need associated with the housing stock, paired with private ownership. The needs of at risk residents are often not met, because programs related to newcomers, youth, families, education, training, and access to daily conveniences, and health services are beyond the scope of private owners. Mechanisms for providing needed social infrastructure within these communities requires further consideration.

In addition, the difficulty in securing financing needed for renewal without relying on rent increases is a challenge. The current situation presents a stalemate preventing investment. Financing alternatives require consideration.

As these buildings continue to age, they will require investment to remain viable housing. Furthermore, this finite resource is becoming a smaller percentage of the overall housing stock. This calls into question the means of providing more affordable housing, from the private, public and not-for-profit sectors, as the region grows. It further highlights the need for a coordinated strategy for reinvesting in this important housing resource and the neighbourhoods in which they lie, as a key aspect of achieving equitable and complete communities throughout the region.
7.0 Conclusion
7.0 Conclusion

For the past few years, the Government of Ontario has been pursuing a number of policy initiatives that, collectively, are intended to revitalize and improve the sustainability and livability of communities across the province. The Growth Plan for the Greater Golden Horseshoe captured this with the introduction of the concept of “complete communities”. The Growth Plan provides the following definition for complete communities:

Complete communities meet people’s needs for daily living throughout an entire lifetime by providing convenient access to an appropriate mix of jobs, local services, a full range of housing, and community infrastructure including affordable housing, schools, recreation and open space for their residents. Convenient access to public transportation and options for safe, non-motorized travel is also provided.

As part of the complete communities agenda, in addition to adopting the Growth Plan, the Province has created Metrolinx and introduced a Regional Transportation Plan for the Greater Toronto and Hamilton Area. It has launched a Poverty Reduction Strategy aimed at reducing the root causes of poverty, particularly amongst youth and New Canadians. And it has adopted substantial greenhouse gas reduction targets and a plan to achieve them, known as the Go Green Action Plan.

There are few locations in the province that could benefit more from the Province’s complete communities and sustainability agenda, and contribute more to their success, than the post-war Apartment Tower Neighbourhoods that have been the subject of this study.

With nearly 2,000 Apartment Towers in the Greater Golden Horseshoe spread across nearly every upper- and single-tier municipality, the potential of this housing resource is tremendous. This study has shown that Apartment Tower Neighbourhoods have the potential to serve as the anchors of an expanded regional rapid transit network. The location and the land areas associated with Apartment Towers Neighbourhoods provide significant opportunity for accommodating mixed-use growth, including the introduction of new housing types, retail and commercial space, and new services and amenities into what are often underserviced neighbourhoods. As well, the frequency with which these towers are as-
Associated with areas of social need and their role as affordable housing stock make them strong candidates for interventions aimed at poverty reduction and fostering social potential. Their size and energy inefficiency relative to other housing types, makes them ideally suited for environmental refurbishment, including district energy systems, to achieve significant greenhouse gas reductions.

Furthermore, their general organization into grouped clusters, housing thousands, presents the framework from which the above initiatives can converge to create well-designed, dynamic, sustainable and livable neighbourhoods throughout the region.

Across Europe, governments have been implementing Tower Neighbourhood Renewal strategies for several decades. In Ontario the potential exists for similar success. Building on the work of the City of Toronto’s Tower Renewal program, there is a significant role for the Province to aid tower communities across the region to achieve their full potential as prosperous, vibrant and sustainable places, while simultaneously achieving key Provincial policy objectives.

There will be challenges to Tower Neighbourhood Renewal in Ontario. These include financing and coordinating the renewal of what are typically privately owned and often fragmented properties; avoiding displacement and economic eviction of existing residents as a result of neighbourhood improvement; and building the policy environment and technical expertise to support the full scope of renewal. This study has identified a number of areas of further research that would help address these challenges and move renewal forward in this province.

Developed as high-density alternatives to bungalow sprawl, Tower Neighbourhoods were progressive experiments in post-war planning. Largely neglected for the past several decades, the aim of Tower Neighbourhood Renewal is to examine the role of these neighbourhoods in achieving complete and sustainable communities across the region. In doing so, it can help implement a range of provincial policy objectives related to achieving a more prosperous, equitable and sustainable Greater Golden Horseshoe, and Ontario as a whole.
Appendices

A. Mapping Clusters and Properties
B. Technical Appendices (Separate Document)
   B.1. Detailed Findings
   B.2. Geographic Information System Methodology
Appendix A: Mapping Clusters and Properties
An Analysis of High-Rise Apartment Tower Neighbourhoods, Developed Between 1945 and 1984

Greater Golden Horseshoe
Apartment Towers and Provincial Policy

Legend
- Apartment Towers
- Existing and Planned Rapid Transit
- Urban Growth Centre
- Built up areas
- Designated Greenbelt Area
- Greater Golden Horseshoe (GGH)
- Greater Toronto and Hamilton Area (GTHA)
- Toronto

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.” Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
MAP 2

MAPS
1) City of Hamilton, Region of Peel
2) Region of Peel and Western Toronto

*Panelled transit refers to the Hamilton 25-Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 3 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network.” Kitchener-Waterloo Light Rail alignment provided by the Region of Waterloo (TTC).

Apartment Clusters
and Properties

Legend
- Approximate Boundary of Urban Growth Centre
- Cluster of 5 or more Apartment Towers
- Cluster of 2-4 Apartment Towers
- Isolated Apartment Towers
- Property boundary, greater than 1 ha
- Property boundary, between 0.5 ha and 1 ha
- Property boundary, less than 0.5 ha
- Planned Metrolinx Light Rail / Bus Rapid Transit (RT)*
- Existing and Planned TTC Subway/RT
- Planned K/W Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH

136km
MAPS
6) Region of Waterloo
7) City of Brantford and County of Brant
8) Region of Niagara

Apartment Clusters and Properties

Legend
- Approximate Boundary of Urban Growth Centre
- Cluster of 5 or more Apartment Towers
- Cluster of 2-4 Apartment Towers
- Isolated Apartment Towers
- Property boundary, greater than 1 ha
- Property boundary, between 0.5 ha and 1 ha
- Property boundary, less than 0.5 ha
- Planned Metrolinx Light Rail / Bus Rapid Transit (RTT)*
- Existing and Planned TTC Subway/RTT
- Planned KW Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area
- Roadway
- Boundary of Jurisdictions within GGH

*Planned transit refers to the Metrolinx 26-Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “26-Year Plan for the Regional Rapid Transit and Highway Network”.

Metrolinx/Metrolinx Light Rail alignment provided by the Region of Waterloo (TBC).
Appendix A
Tower Neighbourhood Renewal in the Greater Golden Horseshoe

MAP 9

MAP 10

MAP 11

MAPS
9) City of Peterborough
10) City of Orillia
11) City of Barrie

Apartment Clusters and Properties

Legend
- Approximate Boundary of Urban Growth Centre
- Cluster of 5 or more Apartment Towers
- Cluster of 2-4 Apartment Towers
- Isolated Apartment Towers
- Property boundary, greater than 1 ha
- Property boundary, between 0.5 ha and 1 ha
- Property boundary, less than 0.5 ha
- Planned Metrolinx Light Rail / Bus Rapid Transit (RTT)*
- Existing and Planned TTC Subway/RT
- Planned K/W Light Rail
- Planned Gateway Mobility Hub
- Planned Anchor Mobility Hub
- Designated Greenbelt Area

*Planned transit refers to the Metrolinx 25-Year Regional Rapid Transit Network.

Base layers for this map, as well as designated Greenbelt Areas and Urban Growth Centre Locations provided by the Ministry of Infrastructure and the Ministry of Municipal Affairs and Housing of the Ontario government.

Regional rapid transit corridors shown on this map are based on the research team’s interpretation of Schedule 2 of the Metrolinx Regional Transportation Plan entitled “25-Year Plan for the Regional Rapid Transit and Highway Network”.

Kitchener/Waterloo Light Rail alignment provided by the Region of Waterloo (TBC).
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9) 04, Flemingdon Park Master Plan, 1958
9) 05, Mount Dennis Development Study, Proctor, Redfern, Bousfield and Bacon, 1964
11) 01-2, Lockwood Survey Corporation Limited
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12) 01, Energy Saving Trust, UK, 2008
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76) 01, Government of Ontario
78) 01, Archives of Uno Prii
88) 01, Government of Ontario

Section 5
104) 03, The Enhanced Social Structure of Gardsten, Gardstensostader, 2008
105) 04-05, The Enhanced Social Structure of Gardsten, Gardstensostader, 2008
107) 06, Kvartersleft: 10 years of Urban Regeneration, Ministry of Refugees, Immigration and Integration Affairs, 2007

Section 6
111) 01, Housing Corporation, UK, 2007
111) 02, Homes and Communities Agency
111) 03, KFW Bankengruppe
112) 01, Jane Farrow
114) 01, Greater London Council, 2009