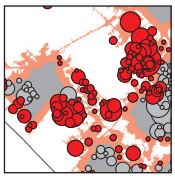
COMMENTARY ON THE ONTARIO GOVERNMENT'S PROPOSED

GROWTH PLAN

FOR THE GREATER GOLDEN HORSESHOE

REVISED EDITION · MARCH 2006



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SUMMARY ➡ The Growth Plan for the Greater Golden Horseshoe (Places to Grow) is a key part of an historic initiative by the Ontario Government to redirect the pattern of urban growth in the Toronto metropolitan region. Its aims are to prevent further traffic congestion, deteriorating air and water quality, the over-consumption of farmland and natural resources, and generally to provide a basis for a strong region and economy in the future.

Neptis research on the region strongly supports the government's growth management activity, as well as the well-conceived goals and the policy directions in the Plan. Yet quantitative research also indicates that the Growth Plan, as it now stands, seems unlikely to achieve its own objectives. This specifically applies to four aspects of growth that are foundations of the Plan.

1. **INTENSIFICATION:** The Plan stipulates that by 2015, 40% of all new residential development must be constructed in existing built-up areas. Research indicates that the amount of new residential development that would be shifted from farmland to genuine intensification is likely to be insufficient to produce the Plan's desired outcomes. More fundamentally, the proposed intensification measure itself is flawed. More direct and effective measures are recommended.
2. **URBAN GROWTH CENTRES:** The Plan identifies 25 Urban Growth Centres, representing a mix of well-established centres, underperforming centres, not-yet existing centres, and the declining downtowns of some smaller cities. Few have transit in place. Under present conditions, they are generally not attractive for office development. A wide array of new regional and centre-specific implementation initiatives will be needed if this goal is to be achieved. Not the least of these is a comprehensive plan for investment in transportation infrastructure, which is now absent.
3. **GREENFIELD DEVELOPMENT:** The Plan requires that future development on greenfields accommodate 50 persons plus jobs per hectare by 2031. Since this target is to be averaged over each upper- and single-tier municipality, substantial areas of greenfields can be built at densities lower than the target, potentially undermining the Plan's basic goal of reducing automobile use. In addition, the target appears to be unenforceable. Other, more effective, measurements and targets are suggested.
4. **GROWTH PROJECTIONS:** The Plan is founded on population and employment projections that assume minimal change in current growth patterns. Neptis questions the wisdom of entrenching what are very nearly business-as-usual growth projections in a plan that is intended to promote and encourage substantial change. The Province is urged to model alternative land use and transportation scenarios in order to better understand the potential costs and effectiveness of different growth and investment options.

Neptis research shows that the Plan needs to be revised and strengthened by other, more effective and precisely targeted measures — if it is to fulfil its goals. Given the momentum of current growth patterns and the volume of conventional greenfield development that is already approved, only very bold action will noticeably alter the future of the region.

COMMENTARY ON THE GROWTH PLAN

The Neptis Foundation

The Neptis Foundation conducts and publishes nonpartisan research on the past, present and future of urban regions. An independent, privately capitalized, charitable foundation, Neptis contributes timely, reliable knowledge and analysis on regional urban development to support informed public decisions and foster understanding of regional issues.

Neptis Papers on Growth in the Toronto Metropolitan Region

On the basis of research, the Neptis Foundation is publishing a series of papers that explore aspects of the proposed Growth Plan and other Ontario government initiatives related to regional planning with the aim of offering nonpartisan commentary for the government's consideration.

Paper 1: Response to the Ontario Government's Discussion Paper *Places to Grow* (September 2004)
Paper 2: Commentary on the Draft Greenbelt Plan (February 2005)
Paper 3: Commentary on the Province of Ontario's Proposed Growth Plan for the Greater Golden Horseshoe (March 2006)

Forthcoming:

Paper 4: Commentary on Residential Intensification
Paper 5: Commentary on Greenfield Development
Paper 6: Commentary on Centres and Corridors

For a complete list of Neptis publications, visit www.neptis.org.

➧ References to Neptis research publications are noted in the margins.

This is a fully interactive PDF document. All internet addresses, note markers, and references to Neptis publications are hyperlinked to their sources.

Maps were produced by the Cartography Office, Department of Geography, University of Toronto.

Revised edition. March 2006.

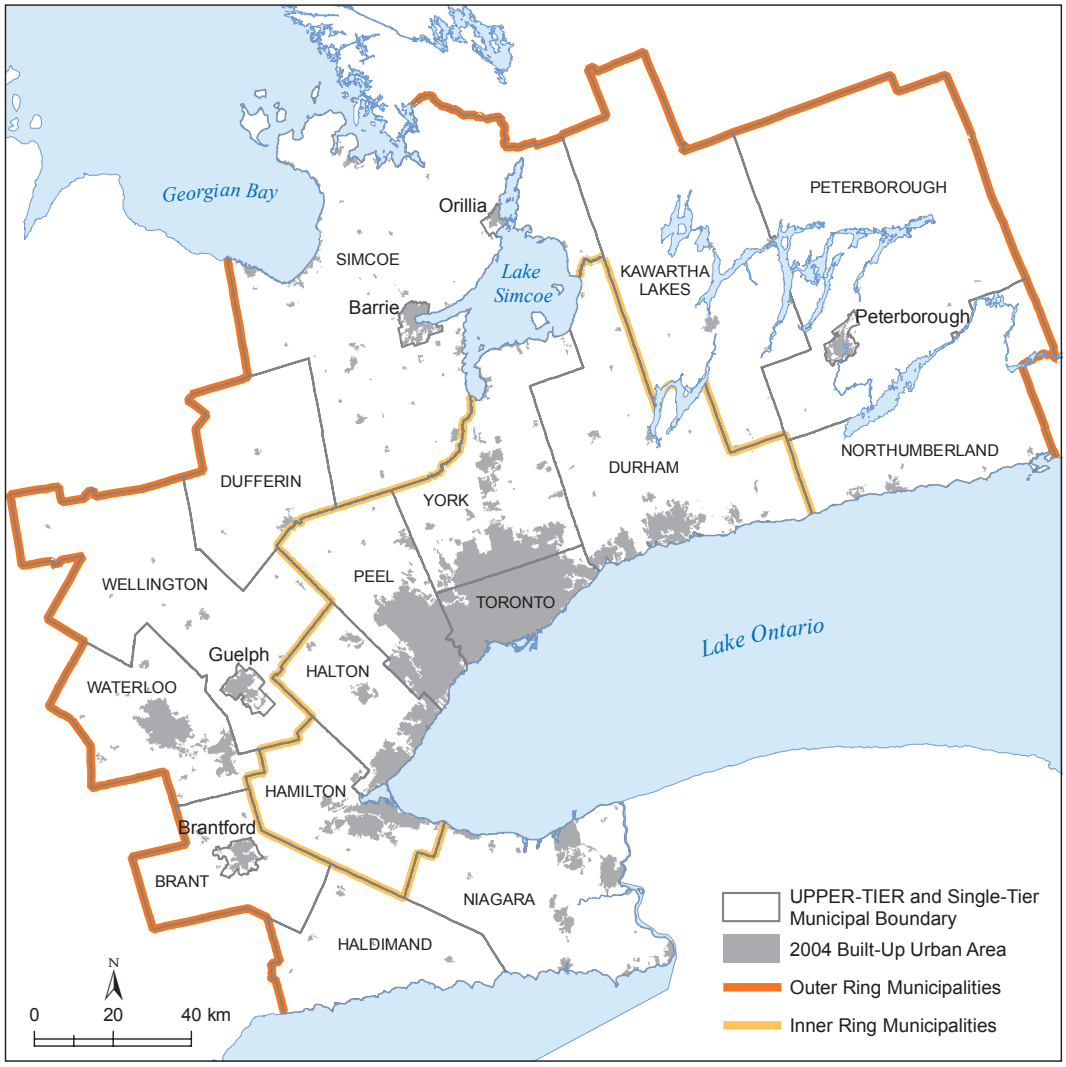
The proposed Growth Plan for the Greater Golden Horseshoe

➡ IBI Group et al., *Toronto-related Region Futures Study* (Neptis, 2003)

The Greater Golden Horseshoe is one of the fastest-growing metropolitan regions in the western world. [SEE FIG. 1.] It has taken 213 years from the establishment of the garrison at Fort York to build the present metropolis. According to government projections, almost 40% of all houses and apartment units that will exist in 2031 will have been built since 2001. Research shows that without very significant change to current automobile-dependent growth patterns, the Toronto metropolitan region will experience greatly increased environmental degradation, traffic congestion and related economic losses, and dysfunctional urban environments.

A year ago, the Neptis Foundation concluded from research that while the Greenbelt is a great public asset, only an integrated regional plan for urban growth would confront the negative effects of urban sprawl and produce a less car-dependent future in the Toronto metropolitan region. Much progress has been made by the Province toward this goal.

FIG. 1: THE GREATER GOLDEN HORSESHOE



➡ *Neptis Commentary on the Draft Greenbelt Plan* (2005)

Since the *Places to Grow* discussion paper was released in the summer of 2004, the Province has released two drafts of a Growth Plan for the Greater Golden Horseshoe that aim to change existing trends by intensifying existing urban areas, concentrating residents and jobs into higher-density mixed-use centres and corridors, and promoting more compact transit-supportive greenfield development. Many other important advances have also occurred, including the enactment of the new Provincial Policy Statement, the Greenbelt, and the *Places to Grow Act*, which for the first time in the province's history establishes a legislative base for provincial plans for metropolitan regions. The government has also released amendments to the *Planning Act* to make sustainable, transit-oriented, and pedestrian-friendly development a matter of provincial interest.

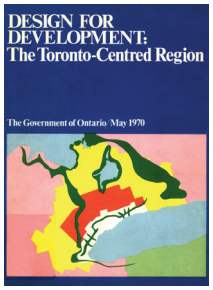
The government is to be commended for its vision and policy directions for the future, for its specific rejection of business-as-usual growth patterns as an acceptable option for obtaining that vision, and for its recognition that it is the proper role of the provincial government to act in the interest of the region as a whole. The Growth Plan is a once-in-a-generation event. It has been many years since the provincial government played such an active role in regional planning. [SEE FIG. 2] There are many possible futures. Choices made now will determine what kind of place the region will become.

The instruments proposed may be insufficient to achieve the Growth Plan's goals

Although much of the work needed to accomplish this Plan lies in the future, there are nevertheless basic weaknesses in the Growth Plan — some technical, others more fundamental — that we suggest need to be addressed now, since the Plan will shape future decisions and actions. The Plan is well conceived in its policy objectives and spirit of engagement, both of which are overdue. Research shows, however, that some of the ways and means the Plan proposes to reach these goals may not be up to the task.

FIG. 2: PAST EFFORTS TO PLAN THE REGION HAVE MET WITH MIXED SUCCESS

The Province of Ontario has in the past attempted to directly manage growth in the Toronto metropolitan region — once in the late 1960s/early 1970s and again in the early 1990s. As University of Toronto historian Richard White explains in his forthcoming Neptis study of the region's planning history, neither attempt had much effect. The 1970s effort, which began with a regional transportation study and culminated in the well-known Toronto-Centred Region concept, yielded a bold, if overaggressive, conceptual plan for the region, but only a few of its features were ever implemented.



The 1990s initiative, through the Province's short-lived Office of the GTA, never got beyond concepts and visions. The region's only effective regional planning body, White argues, was the Metropolitan Toronto Planning Board of the 1950s and 1960s, a body created (but not run) by the provincial government. Although it too had difficulties implementing its plan, its key principle of maintaining contiguity of the urban area, first introduced in 1959, was adopted and still largely guides the region's growth.

Regional planning is evidently not an easy job. As the Province takes on the challenging task yet again, for the first time in nearly a generation, it might do well to consider what worked and did not work in the past.

COMMENTARY ON THE GROWTH PLAN

Observations on the basis of Neptis research

To inform public debate on the Growth Plan, the Neptis Foundation is pleased to offer research-based observations and comments. The achievement of policy objectives is most likely to succeed when performance can be measured and targets are set. *What* is measured matters greatly. If measurements do not reflect what is happening "on the ground" or expected policy outcomes, public infrastructure investment decisions will be skewed. Neptis has focused most of its current program of research on measurable phenomena and, accordingly, this critique concentrates on the quantitative premises and targets of the proposed Growth Plan.

The commentary is grouped into four broad themes:

1. Intensification
2. Urban Growth Centres
3. Development on greenfields
4. Growth projections and change

Intensification

Residential intensification is a centrepiece of the Plan

→ *Commentary on Residential Intensification* (Neptis, forthcoming)

The Provincial government projects that the population of the Greater Golden Horseshoe will increase by 3.7 million between 2001 and 2031. Accommodating a higher proportion of this growth through intensification is a centrepiece of the Growth Plan. In the Plan, the Province generally defines intensification as any development within the existing built-up urban fabric. By this definition, intensification is the opposite of *greenfield development*, or development occurring on rural land outside the built-up urban area. More intensification can reduce the conversion of rural land to urban use, allow for more efficient investment in infrastructure, and increase the viability of public transit. Section 2.2.3 of the proposed Growth Plan specifies that by 2015, a minimum of 40% of all dwelling units built each year in each upper- or single-tier municipality must be located within the built-up urban area. There is no target for non-residential intensification.

Neither the Growth Plan nor its supporting documents offer research-based estimates of current intensification rates. Direct comparisons to intensification measurements and targets used in the U.K., Vancouver, and Sydney are not applicable, as different phenomena are measured in those places.[1]

Achieving the Plan's vision will require a very substantial shift in development patterns

→ IBI Group et al., *Toronto-related Region Futures Study: Sketch Models* (Neptis, 2003)

The potential impact of achieving a 40% rate of intensification on transit use and other behaviours is unknown. However, the *Toronto-related Region Futures Study,* undertaken for Neptis and the Province of Ontario's Smart Growth Secretariat by the IBI Group in 2003, modelled future transit use and rural land consumption under four different scenarios. This research showed that even if policies were enacted that directed a considerably higher proportion of population growth to existing urban areas, transit's share of transportation demand would rise and rural land consumption would fall by only small amounts relative to "business-as-usual." [SEE FIG. 3.] The simulation indicated that modest increases in intensification are likely to achieve little.

FIG. 3: TESTING THE IMPACT OF DIFFERENT GROWTH OPTIONS

In the *Toronto-related Region Futures Study*, four potential growth scenarios were tested in an integrated land use and transportation model. Each scenario assumed a different allocation of population and employment to different locations, as well as different infrastructure investments. The scenarios tested were the "business-as-usual" concept, which assumed the continuation of current trends, the "consolidated" concept, which concentrated future development into nodes and corridors in the urbanized areas of the Inner Ring (the Greater Toronto Area plus Hamilton), the "multi-centred" concept, which placed more development in Outer Ring urban areas, and the "dispersed" concept, which allocated slightly more growth than current trends to greenfields.

The table below shows the impact of the different land use and transportation assumptions on urban area expansion and transit use. The only scenario that produced a significant reduction in the consumption of rural land was the "consolidated" concept, which increased the proportion of residents housed through intensification to 55%. Only the "consolidated" concept increased the proportion of all journeys to work made by local transit from its 2000 value of 12.6%.

	Scenario			
	Business-as-usual	Consolidated	Multi-Centred	Dispersed
% of population growth accommodated through intensification between 2000 and 2031	36%	55%	35%	29%
Built-up urban area — total size in 2031 — increase between 2000 and 2031	2,887 km^2 + 49%	2,672 km^2 + 37%	2,904 km^2 + 49%	2,957 km^2 + 52%
% of journeys to work made by local transit in 2031	11.2%	13.5%	12.3%	10.0%

Values for the Greater Golden Horseshoe, excluding Brant and Haldimand-Norfolk Counties, and the northwestern rural portion of Wellington County.

Intensification is already occurring across the region

➡ *Commentary on Residential Intensification* (Neptis, forthcoming)

If the current rate of intensification is unknown, it is impossible to determine how close or far away different municipalities are from achieving the target. To remedy this gap, Neptis, using a method similar to that proposed by the Province, estimated average municipal intensification rates for 1991 to 2001. [SEE APPENDIX A.] In that decade, an average of about 36% of development in the Greater Golden Horseshoe was in the form of intensification. If Toronto is excluded, the intensification rate was 24%. Inner Ring municipalities recorded higher rates of intensification than those in the Outer Ring. Intensification occurred mainly in lower-tier municipalities with larger existing populations and well-established urban cores. Varying performance between one municipality and another calls the uniform 40% policy into question. While, for example, York Region achieved an average of 31% intensification between 1991 and 2001, Hamilton achieved 22%, and fast-growing Simcoe County achieved only 8%. [SEE FIG. 4.]

If 40% intensification were to be achieved outside the City of Toronto between 2001 and 2031, that would represent only an additional 16% of units built in that area — 227,000 over 30 years — being diverted from greenfields to the existing urban area. [SEE FIG. 5.] How much this shift would change the region's development pattern and contribute to the achievement of the Growth Plan's goals is not known. We strongly suggest that different population distribution, land use, and transportation scenarios be tested through simulation to shed light on the question of how much intensification is needed and where it should be located.

The form and location of intensification matters

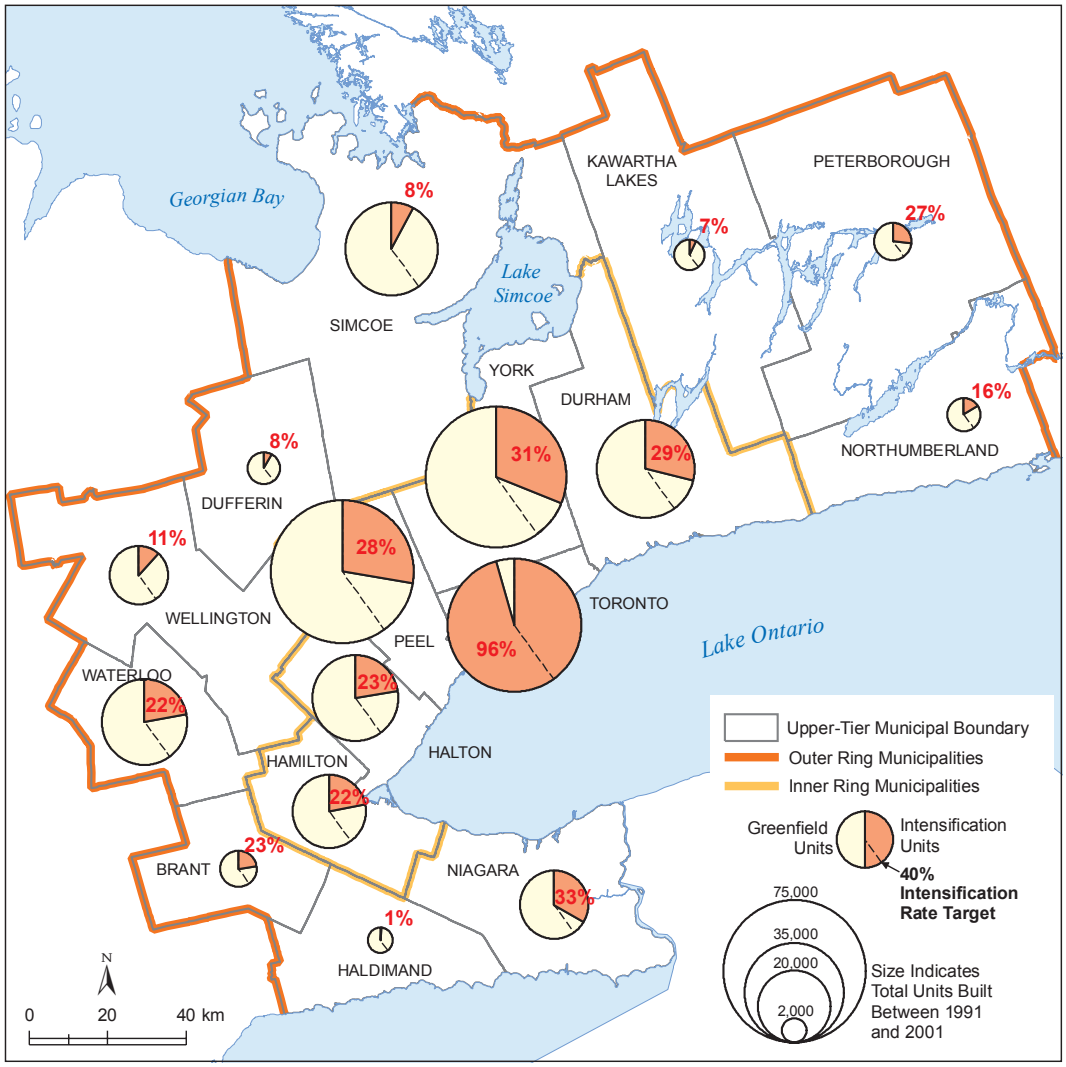
➡ Miller and Soberman, *Travel Demand and Urban Form* (Neptis, 2003)

Residential density on its own is not enough. To achieve the benefits of intensification, housing and workplaces must be added in sufficient quantities in the right locations and in a form conducive to transit use, walking, and cycling. Not all intensification effectively contributes to higher transit use or compact urban form. Intensification that takes the form of low-density residential infill and redevelopment of parcels dispersed throughout the urban fabric irrespective of their relationship to public transit and other infrastructure is likely to be ineffective. While this kind of intensification increases population density on each particular site, it has little impact on transit use, because these sites lack a critical mass of trip origins and trip destinations such as homes, jobs, schools, shops, and other amenities. Intensification will be most effective when it contributes to concentrated mixed-use development. Identifying appropriate sites for intensification in established urban areas can take place only in the context of a region-wide plan for investment in transportation facilities. This has not yet occurred, but is essential to the preparation and revision of local plans.

The intensification measure and target are unlikely to further the goals of the Plan

The 40% residential intensification target does not distinguish between effective and ineffective intensification with respect to the Plan's goals. As a result, it is an unreliable measure of progress toward the goals of the Growth Plan. The research shows that between 1991 and 2001, outside the City of Toronto, approximately half of all units constructed within the existing built-up urban area (i.e., those considered intensification) were located within 500 metres of the urban edge. Development of this sort is presumably the product of many factors such as the changing of greenland designations, leapfrogging and backfilling, the market, and the way the approvals process functions. However, development near the edge of the built-up urban area represents a particularly ineffective type of intensification. [SEE FIG. 6.]

FIG. 4: INTENSIFICATION RATES IN THE GREATER GOLDEN HORSESHOE, 1991-2001



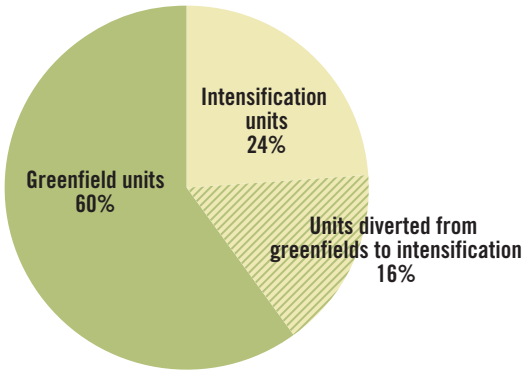
Areas	New dwellings 1991-2001	Intensification units, 1991-2001	Intensification rate, 1991-2001
Inner Ring	298,200	127,700	43%
Inner Ring (excluding Toronto)	232,300	64,700	28%
Outer Ring	112,400	19,400	17%
Greater Golden Horseshoe	410,600	147,000	36%
Greater Golden Horseshoe (excluding Toronto)	344,700	84,000	24%

Dwelling unit quantities are rounded to the nearest hundred.

FIG. 5: THE POTENTIAL IMPACT OF ACHIEVING THE GROWTH PLAN'S INTENSIFICATION TARGET

If 24% of all dwelling unit growth in the Greater Golden Horseshoe outside the City of Toronto is in the form of intensification already, then achieving the 40% target would result in only 16% of all units built outside of Toronto shifting from greenfields to the existing urban area over the 30-year period — about 227,000. Given that the 40% target is slated to come fully into effect only in 2015, halfway through the plan period, the number of units actually diverted is likely to be lower.

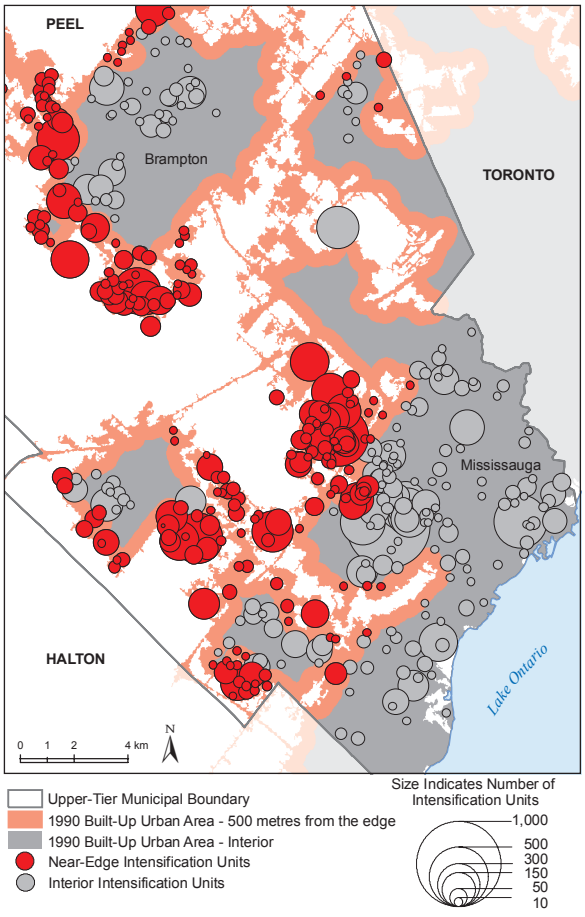
The green and beige wedges of the pie indicate units that would be in the form of intensification or on greenfields regardless of the Growth Plan. The hatched area indicates the proportion of units likely to be diverted from greenfields to intensification as a result of the Growth Plan.



Note: In its "current trends" scenario, the *Growth Outlook for the Greater Golden Horseshoe* projects an increase of 1,721,000 dwellings across the Greater Golden Horseshoe, 1,421,000 of them outside the City of Toronto.

FIG. 6: EFFECTIVE AND INEFFECTIVE RESIDENTIAL INTENSIFICATION IN PEEL REGION, 1991-2001

About 50% of so-called residential intensification that occurred between 1991 and 2001 in the Greater Golden Horseshoe was within 500 metres of the edge of the built-up urban area. The map shows the built-up urban area as it was in 1990 for south Peel Region. Land within 500 metres of the outside edge of the urban area is shown in light red; the interior urban area is shown in grey. The circles indicate the approximate location and magnitude of residential intensification in both the near-edge and interior areas. While filling in holes near the edge of the urban area is a good and likely inevitable part of the development process, it does not represent the kind of effective intensification required to further the goals of the Growth Plan, such as reduced automobile use and more efficient provision and use of infrastructure.



Other measures may be preferable

➡ *Commentary on Residential Intensification* (Neptis, forthcoming)

A more effective approach might be to measure policy outcomes for all types of development. These measures might include the amount and proportion of new population, dwelling units, and office floor space located in designated intensification areas (as measured in Vancouver), the proportion of existing and new population, jobs, dwelling units, and office and retail floor space located within walking distance of higher-order transit within each municipality (as measured in Sydney, Australia), and transportation mode shares within designated intensification areas.

Identifying development opportunities

➡ Blais, *The Growth Opportunity* (Neptis, 2003)

The Growth Plan focuses on the demand side of the equation — the expected need for residential dwelling units and the directive to satisfy more of this need within existing urban areas. But equally important is the supply of development opportunities. If the development process is to be predictable for developers and housing affordable for homebuyers, the Province and municipalities should monitor available land and infrastructure capacity for intensification, much as is already done for greenfield development. As the government's technical paper on implementing the intensification rate target suggests, the Province should establish a common set of definitions, standards, and procedures for municipalities to apply when identifying developable and redevelopable parcels.[2]

Urban Growth Centres

Urban Growth Centres will be difficult to create

Section 2.2.4 of the Plan identifies 25 "Urban Growth Centres" that are intended to be a focus of population and employment growth and investment in transit and other infrastructure. This policy is the most recent version of a series of nodal concepts for the region that have appeared in plans by various levels of government since the 1950s. The Growth Plan is more ambitious than previous policies in terms of both the number of centres it designates and its expectations of each centre.

➡ P. Filion, *Centres and Corridors* (Neptis, forthcoming)

History shows that creating fully developed centres or nodes is difficult. Thirty years of policy promotion have led to the creation of only four major nodes: Yonge and Eglinton, North York Centre, Scarborough Town Centre and Mississauga City Centre. While denser than their surroundings, each has significant shortcomings with respect to residential-employment balance and transportation behaviour. In a study of three established suburban nodes, University of Waterloo Professor Pierre Filion found that due to problems in their internal design and lack of connections to their surroundings, the nodes failed to exhibit what he calls "inner synergies" — for example, high levels of patronage by office workers of retail and food establishments within the centre. In fact, a significant proportion of people who work in nodes were shown to use automobiles to travel within the node and a large majority used automobiles to travel to the node.[3] Overcoming these tendencies will require tight integration with and investment in local and regional transit systems and urban design guidelines that promote a fine-grained mix of uses.

Different types of Urban Growth Centres will require different policies and incentives

The Growth Plan differentiates Urban Growth Centres by the density they are to achieve by 2031 — 400 people plus jobs per hectare for those in the City of Toronto, 200 for those in the rest of the Inner Ring and Waterloo Region, and 150 for those in remainder of the Outer Ring. To bring about these densities, the policy might recognize the differing histories and characteristics of the centres. [SEE FIG. 7.] Examination of the centres' characteristics seems to indicate that the purpose of the policy differs from one type of centre to another. For some, the expected outcome seems to be the revitalization and economic development of depressed areas such as satellite city downtowns; for others, it is to encourage growth in not yet fully developed areas. To achieve these differing outcomes the Plan should contain specific policies and incentives for different types of centres.

FIG. 7: FOUR TYPES OF URBAN GROWTH CENTRES

Instead of categorizing Urban Growth Centres by target density, the Growth Plan policies could distinguish them by their differing histories and characteristics.

1. Centres developed within, or surrounded by, a fully built-up urban environment that are reasonably well served by local transit, such as Yonge-Eglinton, North York Centre, downtown Oakville, and downtown Burlington. Further intensification of these areas may encounter citizen opposition.
2. Existing centres with space for future expansion, including Scarborough Town Centre, Mississauga City Centre, Pickering Centre, and Brampton Centre. These car-oriented areas are largely disconnected from surrounding low-density neighbourhoods. Intensification will require substantial investment in high-quality transit and the redevelopment of surface parking.
3. Centres in outer suburbs that are to be developed on greenfield sites, including Vaughan Corporate Centre and Markham Centre. Their success will depend on the appeal of high-density, transit- and possibly pedestrian-oriented design within outer suburbs whose development has until now been mostly focused on the car.
4. The downtowns of satellite cities that have experienced decades of declining population and employment, such as Brantford and Peterborough. Although these areas have excellent redevelopment potential, substantial investment will be required to break the cycle of decline.

Concentrating employment will be a monumental task

Residential concentration into centres will be hard enough. Employment concentration is likely to be even more difficult. Section 2.2.6.3 of the Growth Plan calls for major office development — defined as 10,000m^2 of floor space or more — to be located in "urban growth centres, major transit station areas, or other areas with existing frequent transit service, or existing or planned higher-order transit service."[4] While in theory office and retail jobs are compatible with and could be moved to nodes, it is far from certain that private enterprise will be attracted to these areas. Research shows that policies promoting the creation of employment concentrations in mixed-use centres have met with limited success in Greater Toronto and elsewhere.[5] In fact, over the past 15 years, the vast majority of office floor space has been constructed in low-cost, highway-oriented, non-transit serviced locations. [SEE FIG. 8.]

It is easier to concentrate residential and retail land uses than it is to attract other forms of employment to urban centres, because they cannot compete with business parks on cost. Footloose firms will choose the least expensive location that suits their needs, especially with respect to low-cost parking. A 2003 study commissioned by the Greater Vancouver Regional District found that the cost of parking construction and lack of automobile access was a major deterrent to businesses locating in designated Regional Town Centres.[6] Dr. Pamela Blais has also found that the current parking standards were a major impediment to achieving denser development in nodes, along with property tax and development charge structures that discourage denser, nodal development. This is affirmed by economist Dr. Peter Tomlinson, who has shown that variation in property tax rates plays a significant role in determining where businesses choose to locate or expand in the GTA and other metropolitan regions.[7]

➡ Blais, *Smart Development for Smart Growth* (Neptis, 2003)

Urban Growth Centres as transit nodes

The Growth Plan concept map displays many future higher-order and inter-regional transit lines connecting Urban Growth Centres to one another. Extraordinary investment would be required to make many of these centres function as nodes of local and regional higher-order transit systems, which the Plan defines as heavy and light rail or buses in their own rights-of-way. Of the 25 centres, four are not currently served by higher-order transit at all. Five are served solely by VIA Rail and eight solely by GO Rail. Only the five centres in the City of Toronto are served by all-day, frequent-service, higher-order transit, and another five are served by more than one mode of higher-order transit.[10]

➡ Filion, *Centres and Corridors* (Neptis, forthcoming)

Furthermore, it is unclear why some of the proposed links are necessary. The potential number of journeys between centres may in some cases be too small to justify the enormous expense necessary to build high-capacity connections between them. A balance is needed. While there is a demonstrable need for higher-order transit connections between some centres — a need not met by the current radial structure of the GO and subway systems — focusing land use policies and transportation investment within the catchment areas of nodes may pay larger dividends in terms of reduced automobile travel. Strong local transit services are the necessary foundation of long-haul transit lines that connect centres. The addition of a policy promoting development at "major transit station areas" in the latest iteration of the Plan could increase transit ridership and permit higher-frequency service as well as revitalizing the areas around underdeveloped TTC subway and GO station areas.

➡ Miller and Soberman, *Travel Demand and Urban Form* (Neptis, 2003)

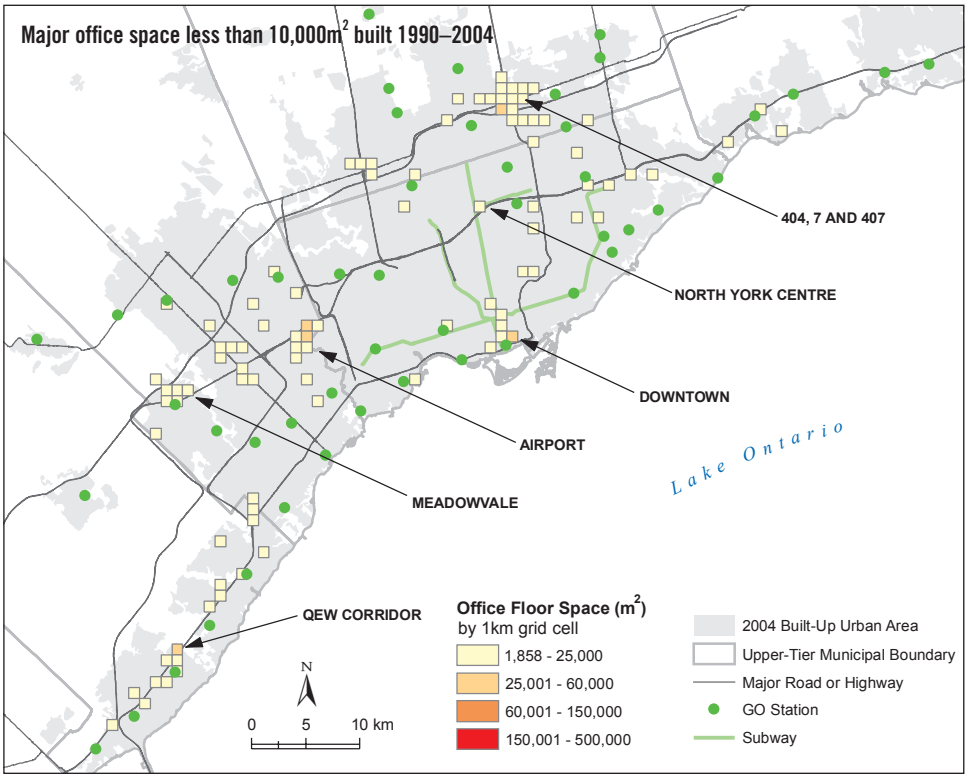
FIG. 8: FEW OFFICES LOCATING IN EXISTING CENTRES, 1990–2004

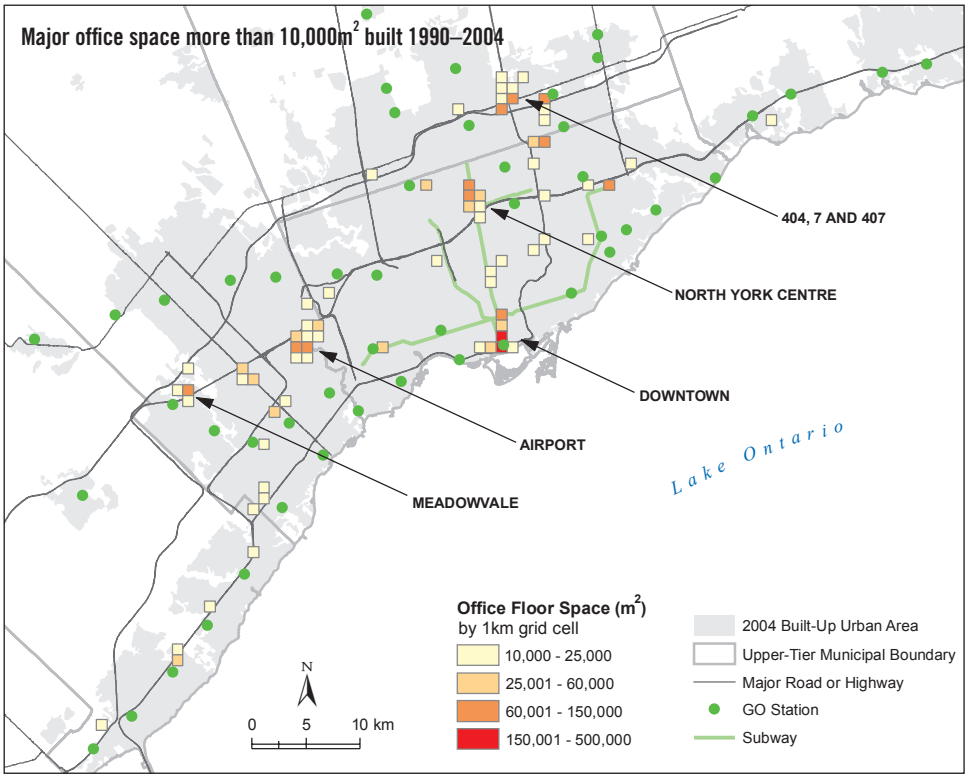
The Greater Toronto market area contains over 14.8 million square metres of commercial office space, of which 3.8 million square metres has been constructed since 1990. Buildings of over 10,000m^2 of floor space account for half of all office buildings and 80% of all floor space constructed since 1990.[8] A 2005 Canadian Urban Institute study for the Toronto Office Coalition indicates that between 1993 and 2005, 62% of new office floor space was constructed in non-transit-supportive office parks. Less than 6% was constructed in commercial subcentres, including North York Centre, Scarborough Town Centre, and Mississauga City Centre.[9]

The Growth Plan seeks to attract office buildings of larger than 10,000m^2 to areas served by existing or planned higher-order transit, which the Plan defines as heavy and light rail or buses in their own rights-of-way. The two maps show the location of office floor space built after 1990 in buildings larger and smaller than 10,000m^2. In each map, floor space has been aggregated up to a 1-km grid. Each coloured square on the map indicates the presence of at least one building; the darker the colour, the more floor space within the square.

The maps indicate that, with the exception of downtown Toronto and North York Centre, office space has located in areas that are not served by higher-order transit. Highway access has been the basic determinant of office location. The two major concentrations of office floor space that have emerged since 1990 are at Pearson Airport and the nexus of Highways 404, 7, and 407 — both off the major transit grid. Meadowvale and, to some extent, the QEW corridor in Oakville illustrate the potential for linking office development to the GO rail system.

Note: Office floor space data was generously provided to the Neptis Foundation by InSite Real Estate Information Systems, http://www.realinsite.com/about/default.asp.





The absence of a transport plan

Creating a system of mixed-use, transit-oriented centres will be difficult, but not impossible. Most of the weaknesses in the expected function of the growth centres would seem to be related to the absence of a phased transportation investment plan at the Greater Golden Horseshoe level. A transportation investment plan is an essential precursor to the revision of municipal official plans. In tandem with the transportation investment plan, there is a need to indicate more fully what is to be expected from different types of centres, major transit station areas, and associated corridors, including guidelines for their design and function.

Further analysis is needed to shape these expectations. Studies of current travel patterns within and between nodes could show where transit investments would achieve the best returns. By modelling different land use and transport scenarios, it will be possible to compare the potential impact on transit use under different configurations. At the same time, the degree to which intensification areas could draw employment away from business parks could also be assessed and incentives designed to achieve the Growth Plan's policy objectives.

Development on greenfields

Most of the expected population increase will continue to be on greenfields

- Taylor, et al. *Land Use and Density Study* (Neptis, forthcoming)
- Miller, et al. *Travel and Housing Costs in the Greater Toronto Area* (Neptis, 2004)

Despite the emphasis on intensification in the Plan, most new development will continue to occur on greenfields. Even if the Plan's 40% intensification target is met by each upper- or single-tier municipality, this would still leave 60% of future households outside today's existing urban area. In fact, an even higher proportion of future population will likely be located on greenfields, because households in more recently developed suburban areas tend to have more people in them than those in older areas. A Neptis study found that the average number of people in each household in areas developed since 1980 is 26% higher than in areas developed before 1980, and 47% higher than in areas developed before 1960.[11]

The momentum of current trends will not soon be reversed. Market and development patterns are well established. Much of the land that is designated urban but is not yet built on is already planned and a good portion of it is covered by approved plans of subdivision. These plans are unlikely to be reopened to conform to Growth Plan requirements. As a result, the prevailing pattern of development is unlikely to be significantly redirected in the near future.

Greenfield development should be concentrated

- *Neptis Commentary on Greenfield Development* (Neptis, forthcoming)
- Miller and Shalaby, *Travel in the Greater Toronto Area: Past and Current Behaviour and Relation to Urban Form* (Neptis, 2000)
- Miller and Soberman, *Travel Demand and Urban Form* (Neptis, 2003)
- White, *History of Regional Planning in Toronto* (Neptis, forthcoming)

The metropolitan form of the Greater Toronto Area is to a large extent the result of policy. Fifty years ago, the Metropolitan Toronto Planning Board established the policy that outward urban growth would be contiguous. This policy supported the efficient provision of water and sewer lines to the metropolis as it grew rapidly in the 1950s, 1960s, and 1970s. The principle was widely admired by other North American regions. The re-enunciation of the principle of contiguous development in the new Provincial Policy Statement (PPS) shows this principle still guides the region's growth.

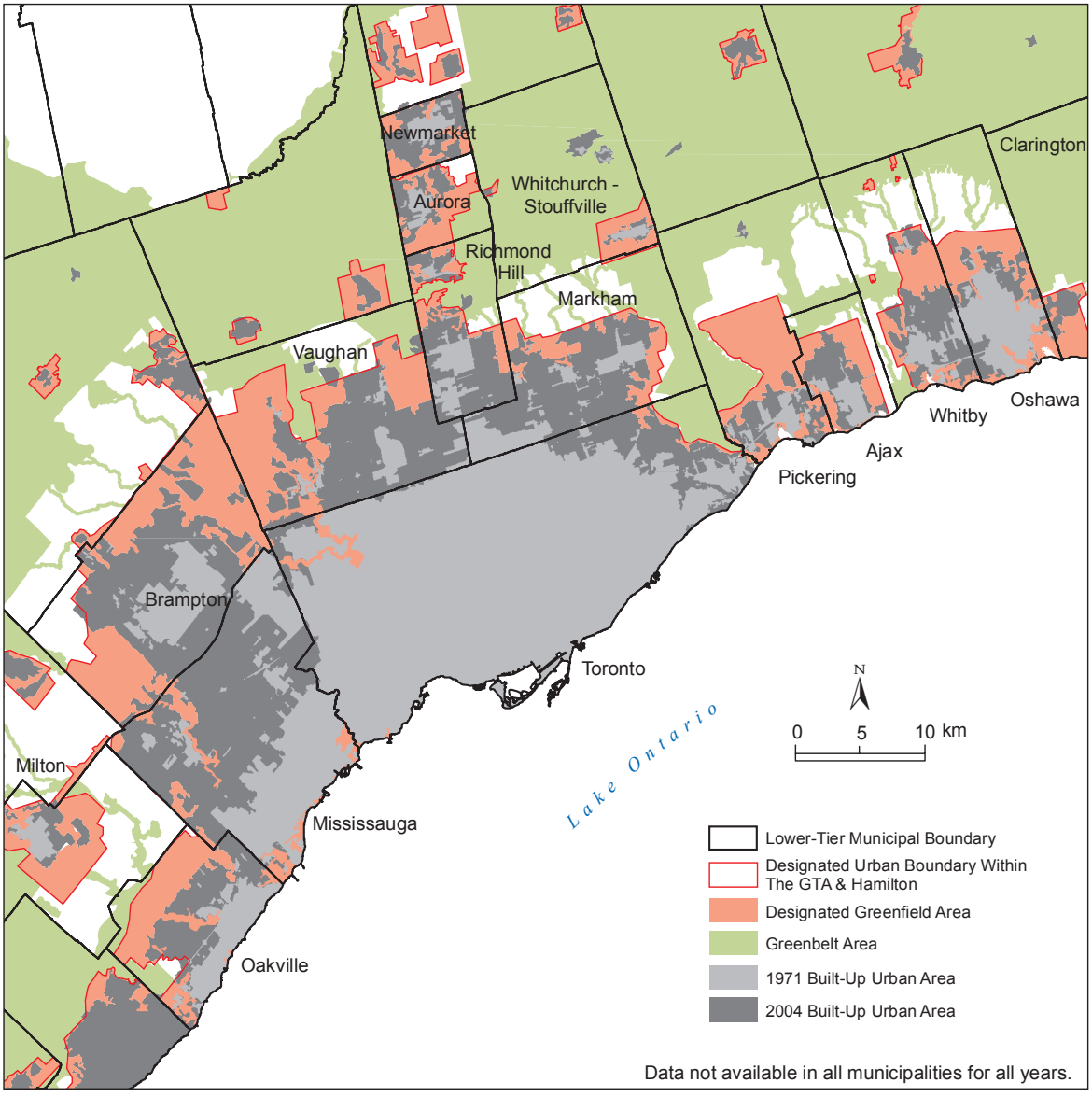
But contiguity by itself does not produce transit-supportive urban areas. Cost-effective and frequent transit service requires concentrated development. One can see this in the GTA's current suburban areas, which are mostly contiguous, but are rarely able to support frequent public transit service because they lack concentrated nodes of population and employment. The long-standing policy and practice of incremental outward expansion of the urban area along all of its edge without points of significant concentration has allowed for growth to be widely distributed, but has undermined the ability to develop cost-effective public transit. [SEE FIG 9.]

The Plan's policy regarding "complete communities" and other policies are intended to promote mix of use and urban form conducive to increased transit use, walking, and cycling. But its implementation, if limited to the scale of the subdivision or even the municipality, may not result in concentrations that support larger regional goals with respect to transit use and other outcomes. Only an integrated land use and transportation plan at the regional scale can bring this about.

FIG. 9: OUTWARD RINGS OF URBAN GROWTH, 1971–2004

Over the past 50 years, the GTA has grown through contiguous addition to existing built-up urban areas. The map shows how the outward expansion of the Toronto-Mississauga urban area has expanded to incorporate formerly freestanding towns such as Brampton, Unionville in Markham, and Richmond Hill.

The locations of designated future greenfield growth areas, shown in red, illustrate the continuation of the policy of contiguous outward expansion. As this area fills up in the coming decades, there will be pressure to open the band of unprotected countryside between the Greenbelt and the present designated greenfield area for development.



Note: The Growth Plan defines the "Designated Greenfield Area" as the "area between the built boundary and the settlement area boundary," i.e., "lands which have been designated in an official plan for development." Similar to the maps in the Growth Plan, the designated greenfield area in this map does not exclude existing designated natural heritage features. Additional natural heritage features are likely to be designated as part of the forthcoming sub-area assessment process described in the Growth Plan.

The density target for greenfields may not further the Plan's goals

➡ Taylor, et al. *Land Use and Density Study* (Neptis, forthcoming)

The Growth Plan contains many policies, but few tools by which to measure progress toward their achievement. There is only one target in the Plan that applies to greenfield development. It requires that all designated but not-yet-developed urban land in each upper-tier municipality be built out at an average of at least 50 people and jobs combined per hectare by 2031.[12] Instead of requiring that every new development achieve a minimum density, the Plan requires that by 2031, all greenfield development as a whole must meet the target. [SEE FIG. 10.]

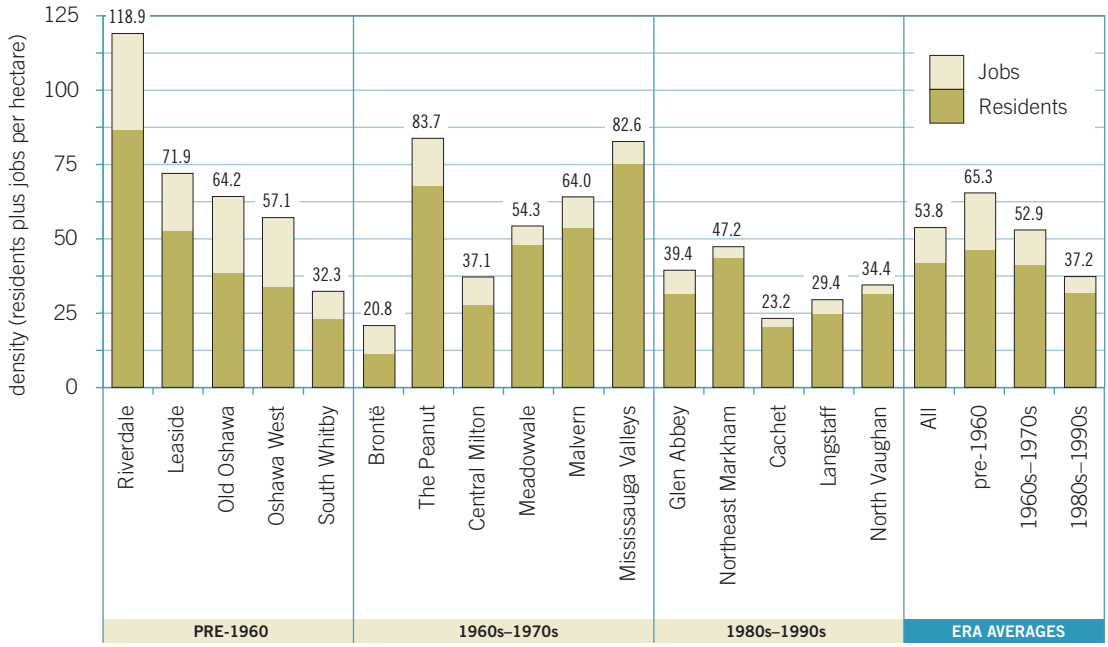
This measure and its target appear to be ineffective and unenforceable. Setting an average density over a broad area certainly permits local densities to be higher in some places and lower in others. But even if the overall target is met, the policy still permits the development of low-density, unconcentrated, non-transit-supportive areas.

FIG. 10: DENSITIES IN THE REGION, 2001

The Growth Plan calls for the designated but not-yet-built urban area of each upper-tier municipality in the region, net of natural heritage systems, to be built out at a density of 50 people plus jobs per hectare as of 2031. The government considers this density to be the minimum required to support basic bus service at reasonable cost.

A study of 16 largely residential, 400-hectare (2-km-square) areas in different parts of the GTA, representing different eras of development, showed that the more recent the development, the lower the population and employment density. The five areas built out in the 1980s and 1990s average 37 people plus jobs per hectare. Research shows that designated employment lands typically accommodate fewer than 40 jobs per hectare. To achieve an overall density of 50 people plus jobs per hectare, densities in both residential neighbourhoods and employment lands would have to increase.

Population and employment density (developable area, in 2001)



Note: The densities shown are calculated on developable area. Where designated, natural heritage features have been removed from the gross land base.

Also, the policy may be undermined by long-term trends, such as an expected decline in average household size. Over time, population density will fall as fewer people occupy the same number of dwellings. For the density target to be achieved by 2031, municipalities would not only have to require developers to determine how many people will live in their proposed subdivisions when they are first built, but also in the future.

A similar uncertainty exists for employment. Research shows that jobs "fill in" to new developments more slowly than residents. Over time, the structure of the economy and nature of the labour force change. It is difficult to predict how many jobs will exist in an area, large or small, 20 or 25 years in the future.

Other approaches are possible

Policies and targets for greenfield development with respect to density and mixture of uses will need to be clear, effective, and enforceable. To ensure that new subdivisions meet the goals of the Plan, the government might consider other measures. In the United Kingdom, for example, the government has imposed a minimum density requirement of 30 units per hectare for all new subdivisions. [SEE FIG. 11.] Since the target is applied during the approval process, there is no need to wait until 2031 to find out if the target has been met. Such an approach could be applied in Ontario under proposed changes to the Planning Act, which would permit municipalities to set conditions for development approvals, including specifying minimum and maximum densities and building heights.

Although the U.K. target has some advantages over the target proposed in the Growth Plan, it does not address employment or encourage mixed-use development. The Province is strongly urged to explore the feasibility of establishing targets for population-to-employment ratios and transit use and develop design guidelines for transit-supportive employment lands.

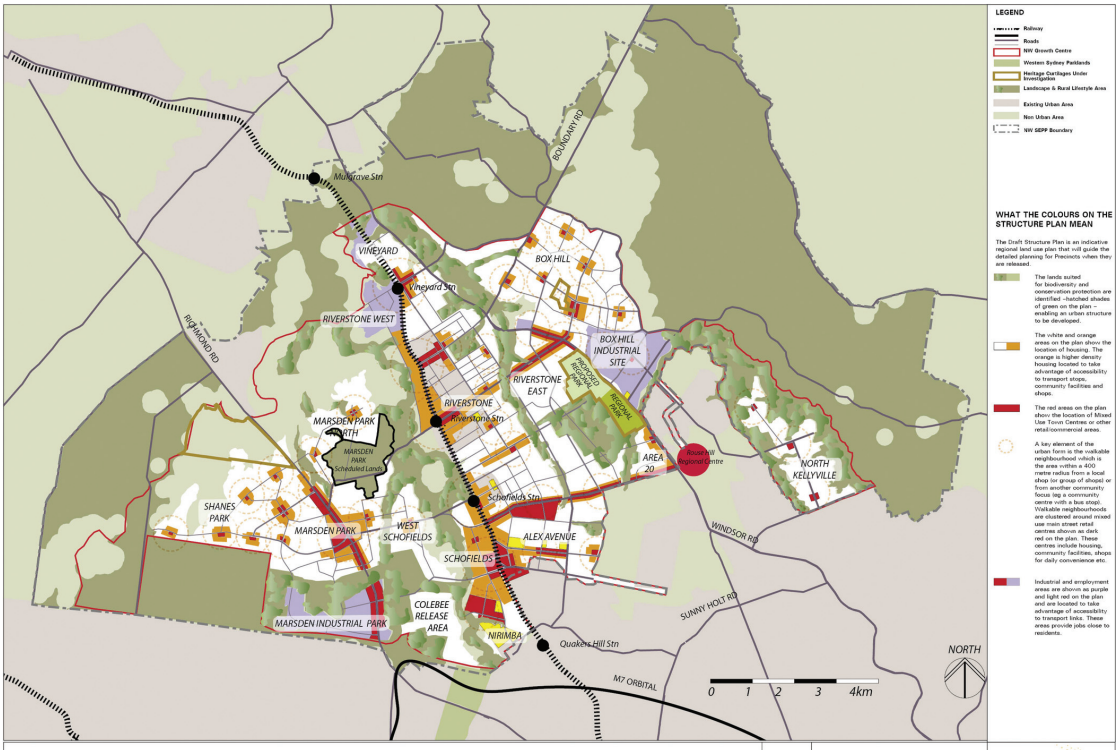
In New South Wales, Australia, the state government, rather than municipalities, manages the process of releasing greenfield land for development in the Sydney region. Under the Metropolitan Development Program, the state studies the potential of areas for accommodating population and employment growth and produces high-level structure plans to which subsequent local planning and infrastructure investment must conform. [SEE FIG. 12.]

FIG. 11: MINIMUM DENSITY REQUIREMENTS FOR GREENFIELD DEVELOPMENT IN THE U.K.

Since December 2002, local planning authorities in rapidly growing parts of the United Kingdom have been required to consult the national government before permitting individual developments of less than 30 dwelling units per hectare. The government has indicated that it will intervene if this threshold is not met. The policy was extended to additional areas in December 2005.[13] Between 2001 and 2004, the average density of development on greenfield land rose from 25 to 44 units per hectare.[14] By comparison, the residential portions of Leaside and northeast Markham are built out at about 37 and 20 units per hectare, respectively.[15]

FIG. 12: LAND RELEASE IN SYDNEY, AUSTRALIA

Since the 1980s, greenfield development in the Sydney metropolitan region has occurred through systematic study and release of land led by the New South Wales government. A Land Release Advisory Committee with representation from state ministries, local councils, and the development industry makes recommendations on land release to the cabinet, which has approval authority. In the latest round of the Sydney Metropolitan Strategy, the state has approved and prepared structure plans for two new greenfield development areas. These structure plans define residential, commercial, industrial, and open space areas. The release areas are focused on a hierarchy of mixed-use cores that are integrated into local and regional bus and rail systems. The map below shows the structure plan for the North West Growth Centre. In tandem with the structure plan is a plan for phased investment in transportation and other infrastructure. Local planning and private investment take place within this planning and investment framework, which itself is a component of the state's strategy for the full metropolitan region.[16]



Source: Government of New South Wales, *North West Growth Centre Draft Structure Plan* (Sydney, June 2005).

Growth projections and change

The growth projections entrenched in the Plan differ little from business-as-usual

The Plan contains projections for each upper- and single-tier municipality in the Greater Golden Horseshoe. The Province and municipalities are to use these projections as the basis of land designation and investment decisions. Both the general public and the private sector will use these projections to justify the need for, or to oppose, particular developments before councils and the Ontario Municipal Board.

The *Growth Outlook* commissioned by the Province contains three scenarios, each of which allocates population and employment to municipalities in different proportions. According to the *Growth Outlook*, the "current trends" projections represent "the most likely distribution of growth based upon the current level of policy intervention, current and future settlement patterns, and the provision of necessary infrastructure to support growth." The "compact" and "more compact" scenarios are "policy-based forecasts [that] reflect greater levels of policy intervention required to achieve the objectives of the *Places to Grow* discussion paper released by the Province in the summer of 2004."[17] The Province has chosen to build its Growth Plan on the "compact" scenario. But this scenario does not differ much from the "current trends" scenario. The "compact" scenario assumes no change in the distribution of population and employment growth between the Inner and Outer Rings relative to the "current trends" scenario, and, within the Inner Ring, it increases the City of Toronto's share of growth by only 80,000 people over 30 years, or 2.2% of projected growth in the Greater Golden Horseshoe.[18]

➡ IBI Group et al., *Toronto-related Region Futures Study: Sketch Models* (Neptis, 2003)

In principle, the Plan should encourage a distribution of growth among upper- and single-tier municipalities that maximizes opportunities for the achievement of the Plan's objectives. Both the scenario testing done as part of the *Toronto-related Region Futures Study* and work by Blais for Neptis and the Province on identifying opportunities for better use of infrastructure indicate that the Growth Plan's goals might be more easily achieved by shifting more growth to areas where efficient systems are well established and can be expanded and fortified. While some of this shift may be accomplishable within municipal plans, it would be best if the Province could set in place a region-wide growth distribution scenario that better faciliates and supports the Growth Plan's goals.

➡ Blais, *The Growth Opportunity* (Neptis, 2003)

Moreover, future economic circumstances may shift growth in unexpected ways. Research for Neptis by housing economist Will Dunning indicates that economic factors influence people's choice of where to live. Over the lifetime of the Plan, higher house prices and lower job opportunities in the GTA may "deflect" people who would otherwise locate in the GTA to the Outer Ring and elsewhere. The result could be a quite different distribution of population growth, and a corresponding over-allotment of land for future urban expansion in the Inner Ring and under-allotment in the Outer Ring.

➡ Will Dunning Inc., *Economic Influences on Population Growth and Housing Demand in the Greater Golden Horseshoe* (Neptis, 2006)

It would be advisable to test the effects of different growth distributions and infrastructure investments before projections are entrenched in the Plan.

Concluding observations

Bolder action is indicated

While the policy objectives contained in the Plan are very well conceived, the implementation framework may not be strong enough to bring them about. Research indicates that achievement of the Plan's targets may not be enough to alter travel behaviour or reduce the consumption of rural land and that the centres will be very difficult and expensive to create. Given the failures of most past attempts to shape the region's growth and the magnitude of change required to alter current trends and patterns, bolder action is required if real change is to occur.

More research and better information is needed

To assess the potential impact of the Plan's policies, more and better information is needed. It is essential to determine, for example, where and to what extent development can and should be concentrated — on greenfields and within the existing urban fabric — to produce desired policy outcomes such as reduced automobile use. Further, the Province will need to overcome the wide disparity in the quality and comparability of information currently gathered by municipalities across the region.

Measuring progress against targets

As the Plan is implemented, progress toward achieving quantifiable goals can and should be measured. However, the performance measures and targets in the Growth Plan, particularly the intensification rate target and the greenfield density target as they now stand, will not function as effective barometers of progress. A more comprehensive series of indicators that monitor the location and density of people, dwellings, jobs, and office floor area would be required to capture the full range of desired policy outcomes "on the ground."

The lack of integrated land use and transportation analysis undermines the Plan

For the Growth Plan and subsequent decisions to be effective, it will be necessary to test the impacts of different policy-driven land use and infrastructure investment scenarios on such things as transportation behaviour, air quality, and housing prices. Without a region-wide plan for transportation investment, local land-use and transportation planning efforts are unlikely to support each other. Before municipal governments can revise their official plans and zoning by-laws and before they can make development decisions, the Province, we believe, should commit to a phased program of investment into specific infrastructure projects. The private sector also requires predictability if it is going to do its part in realizing provincial objectives. With limited resources, it is essential to know, for example, how much investment will be required to build the Urban Growth Centres and the transit network that will serve them. Making such commitments will require detailed and focused analysis.

The opportunity for change is limited and will diminish further as time passes

While the Province's re-engagement in regional planning is welcome, time is short. The pathologies of the existing urban area, combined with the many hectares of unbuilt land that are already approved for development, mean that it will be years before the new policies produce visible change. It may also take the better part of a decade for municipalities to incorporate the new policies into their plans and zoning by-laws. By the time all of the wheels are turning at all levels, the planning period may be half over and, if the slowing of growth occurs in later decades, more than half of projected population growth will have occurred. Making the right choices today will permit rapid and decisive action tomorrow.

Notes

1. See, for example, Urban Strategies, Inc. *Application of a Land-Use Intensification Target for the Greater Golden Horseshoe*. Prepared for Ontario Growth Secretariat, Ministry of Public Infrastructure Renewal (Winter 2005).

2. Urban Strategies, Inc. *Application of a Land-Use Intensification Target for the Greater Golden Horseshoe*. Prepared for Ontario Growth Secretariat, Ministry of Public Infrastructure Renewal (Winter 2005), 14.

3. Filion, P. "Suburban mixed-use centres and urban dispersion: what difference do they make?" *Environment and Planning A* 33 (2001) 141-160.

4. 10,000m^2 is equivalent to 107,639 sq.ft. of floor space.

5. See G. Gad and M. Matthew, "Central and Suburban Downtowns," in T. Bunting and P. Filion, eds., *Canadian Cities in Transition*, 2nd ed. (Toronto: Oxford, 2000) 248-74; Canadian Urban Institute, *Business Competitiveness in the GTA: Why Toronto is Losing Ground – Final Report*, for the Toronto Office Coalition (Toronto: CUI, 2005).

6. Royal LePage, *Commercial and Industrial Real Estate Development Trends and Forecast for the Greater Vancouver Region, 1991-2021* (Vancouver: GVRD, 2003).

7. Tomlinson, Peter. *A Level Playing Field by 2009: Achieving Property Tax Parity for Toronto Businesses*. Prepared for the Toronto Office Coalition (2006) 50-57.

8. Dataset includes all buildings over 20,000 sq. ft. (1,858m2). Government and institutional buildings are excluded.

9. Canadian Urban Institute, *Business Competitiveness in the GTA: Why Toronto is Losing Ground – Final Report*, for the Toronto Office Coalition (Toronto: CUI, 2005). Calculated from Table 2-1.

10. Ontario Growth Secretariat, *Urban Growth Centres in the Greater Golden Horseshoe* (Toronto: Ministry of Public Infrastructure Renewal, 2005).

11. Similar increases are true with respect to rooms per dwelling. Houses in the suburbs tend to be larger.

12. *Proposed Growth Plan for the Greater Golden Horseshoe* (Nov. 2005) s. 2.2.7(1)

13. Office of the Deputy Prime Minister (U.K.), *Circular 01/05: The Town & Country Planning (Residential Density) Direction 2005* (London: HMSO, 2005) <http://www.odpm.gov.uk/index.asp?id=1144325>.

14. Office of the Deputy Prime Minister (U.K.), *Land Use Change in England: Residential Development to 2004 (LUCS-20)* (London: HMSO, May 2005) 18.

15. The U.K. and Ontario dwelling unit densities cited, while calculated from similar land bases, are not strictly comparable. The Ontario densities are based on the net lot area, excluding roads, parks, schools, and other public or common space. The U.K. densities include some common space such as local play areas and incidental open space. See Office of the Deputy Prime Minister (U.K.), *Planning Policy Guidance 3: Housing* (London: HMSO, 2005) Annex C: Definitions.

16. Government of New South Wales, *Managing Sydney's Growth Centres '05* (Sydney, June 2005); Government of New South Wales, *Preliminary Infrastructure Report for the North West and South West Growth Centres* (Sydney, June 2005); Government of New South Wales, *Planning Report for the North West Growth Centre* (Sydney, June 2005); Government of New South Wales, *Planning Report for the South West Growth Centre* (Sydney, June 2005).

17. Hemson Consulting, *Growth Outlook for the Greater Golden Horseshoe* (2005) ii.

18. The *Growth Outlook*'s "compact" scenario increases the City of Toronto's share of projected region-wide population growth from 11.0% to 13.2%. By contrast, in the *Toronto-related Region Futures Study* (see Figure 3 on page 6), the "consolidated" sketch model increased the City of Toronto's share of projected region-wide population growth by 6.1% relative to the "business-as-usual" sketch model, from 11.8% to 17.9%.

Appendix A: Summary of the intensification analysis

The following is a summary of two technical papers that are currently in progress. The first will document methods used to derive a 1990 built-up urban boundary from satellite imagery, and the second will describe the use of census data to estimate average intensification rates from 1991 to 2001. These papers will be published and distributed through a working research paper series website hosted by the Geography Department at the University of Toronto. The methods described below and in the technical papers have been presented to and commented upon by academics in the fields of image processing, geographic information science, and urban geography.

The objective of the research was to develop a method of estimating recent historical rates of intensification that would mimic the approach proposed in the Growth Plan for the Greater Golden Horseshoe and its supporting documents, developed by the Province of Ontario. Building on research undertaken in 2004, Neptis derived a 1990 boundary for the built-up urban area in the Greater Golden Horseshoe (GGH). The analysis was to accurately and conservatively identify the consolidated urban area in the region, as opposed to small, scattered urban features located far from large contiguous urban areas. Imagery captured by Landsat Thematic Mapper 5 (30-metre resolution) in summer 1990 was selected for the urban boundary analysis. Several image enhancement techniques were performed, such as texture analysis, normalized difference vegetation indexing, principal component analysis, and image differencing, in order to employ more than the spectral values of the imagery in the analysis. A supervised classification was conducted using a Bayesian Probability Function calculated from the inputs for classes established from training sites. Each pixel is assigned to the class to which it most probably belongs. The classification produced a data set with three categories: water, non-urban, and urban. The overall accuracy of the classification was 98.33%, with a 91.04% user's accuracy for the urban class, meaning that over 91% of the pixels classified as urban correspond with urban features on the ground.

The 1990 urban area boundary was then used with 2001 census geographic units and two census variables to estimate intensification rates for all upper- and lower-tier municipalities in the GGH. Initially the 1990 urban boundary was used to select all dissemination areas (DAs) that intersect the boundary. The analysis captured not only DAs that are completely contained within the 1990 urban area, but also DAs that straddle the boundary. For these DAs, the period of construction census variable was used to sum all dwellings built between 1991 and 2001. To identify the number of dwellings that fall outside the urban boundary, census blocks (a very small geographic unit whose boundaries correspond to neighbourhood blocks) were employed. The 2001 census enumerated all dwellings for each census block. A second intersection analysis was used to identify all blocks of which more than 50% fell outside the 1990 urban area. The dwellings units were summed for these blocks. The block sum was then subtracted from the DA sum to yield all dwellings within the 1990 urban area that were built between 1991 and 2001.

Next, a buffer analysis was performed, which calculated a 500-metre distance inside the urban boundary. DAs of which 90% or more was within the 500-metre buffer were identified. The period of construction variable was summed for these selected DAs, yielding the number of dwellings built between 1991 and 2001 within 500 metres of the urban boundary.

Appendix B: Notes on data sources and methodology for figures

Maps in figures 1, 4, 5, 6, 8, and 9 were created by the Cartography Office, Department of Geography, University of Toronto.

Figure 1: The Greater Golden Horseshoe

DATA SOURCES

Municipal Boundaries: Statistics Canada, 2001
2004 Built-up Urban Area: Neptis Foundation, June/August 2004
Hydrography: National Topographic System, 1:50,000 & 1:250,000, 1992–1998

ADDITIONAL DATA DESCRIPTION

The 2004 built-up urban area is derived from 2004 Landsat Thematic Mapper 5 Imagery. This process is documented in the *Neptis Commentary on the Draft Greenbelt Plan* (January 2005). http://www.neptis.org/library/show.cfm?id=67&cat_id=30

Figure 2: Past efforts to plan the region have met with mixed success

IMAGE SOURCE

Detail from the cover of Government of Ontario, *Design for Development: The Toronto-Centred Region* (Toronto: May 1970).

Figure 3: Testing scenarios

DATA SOURCE

IBI Group in association with Metropole Consultants and Dillon Consulting Ltd., *Toronto-Related Region Futures Study: Sketch Modelling of Four Alternative Development Concepts*. Commissioned by the Neptis Foundation for consideration by the Central Ontario Smart Growth Panel. (Toronto: Neptis Foundation, 2003).

ADDITIONAL DATA DESCRIPTION

Data shown are for the Greater Golden Horseshoe, excluding Brant and Haldimand-Norfolk Counties and the rural northwest portion of Wellington County. Each of the four scenarios, known as sketch model concepts, assigned projected future population to different geographical areas defined by their characteristics called superzones. The proportion of population accommodated through intensification was determined by dividing the number of people allocated to the "existing urbanized areas, nodes and corridors" and "existing urbanized areas, all other" categories by the total projected population (see Exhibit 3.2). The increase in built-up urban area was calculated using values in Exhibit 3.5. Total built-up area in 2000 is 1,944 km^2. Change in AM peak period modal share for transit was calculated using values in Exhibit 3.12. Transit modal share values do not include GO Transit.

Figure 4: Intensification rates in the Greater Golden Horseshoe, 1991–2001

DATA SOURCES

Municipal Boundaries: Statistics Canada, 2001
Occupied Private Dwellings (100% sample), Blocks: Statistics Canada, 2001
Occupied Private Dwellings, Period of Construction (1991–1995, 1996–2001) (20% sample), Dissemination Areas: Statistics Canada, 2001.
Hydrography: National Topographic System, 1:50,000 & 1:250,000, 1992–1998

ADDITIONAL DATA DESCRIPTION

Both dwellings data sets, all private, occupied dwellings and a subset of dwellings constructed between 1991 and 2001, were used to estimate the rate of intensification at upper- and single-tier municipalities. A summary of the process is provided in Appendix A of this document. A technical paper will soon be available in a working research paper series published by the Department of Geography at the University of Toronto and distributed via the Internet.

Figure 5: The potential impact of achieving the Growth Plan's intensification target

DATA SOURCES

Dwelling unit projections: Hemson Consulting, *Growth Outlook for the Greater Golden Horseshoe* (2005).
Intensification rate 1991–2001: See notes for Figure 4.

ADDITIONAL DATA DESCRIPTION

In its "current trends" scenario, the *Growth Outlook for the Greater Golden Horseshoe* projects an increase of 1,721,000 dwellings across the Greater Golden Horseshoe, 1,421,000 of them outside the City of Toronto. If the intensification rate remained at its estimated 1991-2001 value, 24%, between 2001 and 2031, 341,040 of dwelling units projected to be built outside Toronto in the Greater Golden Horseshoe would be on intensification sites. To bring the intensification rate to 40% over the 2001–31 period would require the diversion of an additional 16%, or 227,360 dwelling units, from greenfield to intensification sites.

Figure 6: Effective and ineffective residential intensification in Peel Region, 1991–2001

DATA SOURCES

Municipal Boundaries: Statistics Canada, 2001
1990 Built-up Urban Area[a]: Neptis Foundation, October 2005
Occupied Private Dwellings, Period of Construction (1991–1995, 1996–2001) (20% sample)[b]: Dissemination Areas (DAs), Statistics Canada, 2001.
Hydrography: National Topographic System, 1:50,000 & 1:250,000, 1992-1998

ADDITIONAL DATA DESCRIPTION

a. The 1990 built-up urban area is derived from 2004 Landsat Thematic Mapper 5 imagery. A summary of the process is provided in Appendix A of this document. A technical paper will soon be available in a working research paper series published by the Department of Geography at the University of Toronto and distributed over the Internet.
b. Identifying near-edge and interior intensification units required the use of DA-level dwelling construction period data and the 1990 urban area and the development of a suitable threshold measuring the amount of DA area within the 1990 urban boundary. A summary of the process is provided in Appendix A of this document. A technical paper will soon be available in a working research paper series published by the Department of Geography at the University of Toronto and distributed over the Internet.

Figure 8: Few offices locating in existing centres, 1990–2004

DATA SOURCES

Office Floor Space[a]: InSite, 2005
2004 Built-up Urban Area[b]: Neptis Foundation, June/August 2004
Municipal Boundaries: Statistics Canada, 2001
Major Roads and Highways: National Road Network, 2005
GO Stations: GO Transit, 2005
Toronto Transit Commission (TTC) Subways: TTC, 2005
Hydrography: National Topographic System, 1:50,000 & 1:250,000, 1992–1998

ADDITIONAL DATA DESCRIPTION

a. Office floor space data was generously provided by InSite Real Estate Information Systems, http://www.realinsite.com/about/default.asp. Although the map only shows a subset of the data (office built post-1990), the complete data set includes all office buildings in the Greater Toronto Market Area, as well as six other major market areas across Canada, with a floor space of 20,000 or more square feet. The data was originally provided as address-

based data which was then geocoded to a 2005 street network. A grid of 1-square-kilometre cells was created for GTA, and each address point was associated to a grid cell. The floor space for office buildings within each grid cell was then summed. InSite holds exclusive copyright to these data. For more information on the InSite data, please contact info@realinsite.com.
b. The 2004 built-up urban area is derived from 2004 Landsat Thematic Mapper 5 imagery. This process is documented in the *Neptis Commentary on the Draft Greenbelt Plan* published January 2005. http://www.neptis.org/library/show.cfm?id=67&cat_id=30.

Figure 9: Outward rings of urban growth, 1971–2004

DATA SOURCES

Municipal Boundaries: Statistics Canada, 2001
Designated Greenfield Area[a]: Municipal Official Plans, Ontario Ministry of Municipal Affairs & Housing, ~2005
Greenbelt Area, Ontario Ministry of Municipal Affairs and Housing, 2005
1971 Built-up Urban Area[b]: Canada Land Use Monitoring Program (CLUMP), Natural Resources Canada, 1999
2004 Built-up Urban Area[c]: Neptis Foundation, 2005

ADDITIONAL DATA DESCRIPTION

a. The designated greenfield area data set, also known as designated urban expansion land or designated settlement area, was compiled using municipal official plans and maps produced by the Ontario Ministry of Municipal Affairs and Housing. This process is documented in the *Neptis Commentary on the Draft Greenbelt Plan* published January 2005. http://www.neptis.org/library/show.cfm?id=67&cat_id=30.
b. The original data source for 1971 built-up urban area is derived from CLUMP. The method of delineating the urban area under CLUMP can be found at http://geogratis.cgdi.gc.ca/clf/en?action=entrySummary&entryId=8537&entryType=productCollection&keymap=outlineCanada. The CLUMP data set was further manipulated to make it comparable to the 2004 built-up urban area. A technical paper describing this process will soon be available in a working research paper series published by the Department of Geography at the University of Toronto and distributed over the Internet.
c. The 2004 built-up urban area is derived from 2004 Landsat Thematic 5 Mapper imagery. This process is documented in the *Neptis Commentary on the Draft Greenbelt Plan* published January 2005. http://www.neptis.org/library/show.cfm?id=67&cat_id=30.

Figure 10: Densities in the region, 2001

DATA SOURCES

Resident population and employment: Census tracts, Statistics Canada, 2001.
Land areas for Riverdale, Leaside, Old Oshawa, the Peanut, and Meadowvale: Lehman and Associates, *Urban Density Study* (Toronto: Office of the Greater Toronto Area, 1995).

ADDITIONAL DATA DESCRIPTION

The densities shown are calculated on developable area. The developable area was determined through measurement of land areas drawn from a variety of municipal sources. Where designated, natural heritage features have been removed from the gross land base. All sources will be documented in a forthcoming report to be published by Neptis on the relationship between land use and density.