



The State of **Active Transportation** Greater Toronto, Hamilton and Beyond

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by the Clean Air Partnership



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EXECUTIVE SUMMARY

The dominant pattern of development in Greater Toronto and Hamilton (GTHA) has for decades been low-density, with the various land uses—residential, commercial and other—separated. Unfortunately, the region's transportation network has not developed at the same pace and to the same extent. As a result, the region is highly dependent on single-occupancy motor vehicles for its transportation needs, a dependency which is having negative impacts on the health of GTHA's people, economy and environment. Toronto Public Health estimates that transportation-related air pollution causes 440 premature deaths, 1,700 hospitalizations and 200,000 restricted activity days per year in the City of Toronto alone, for example (Toronto Public Health 2007).

Active transportation—i.e. walking and bicycling—is a compelling alternative to single-occupancy motor vehicles for a great many reasons. Walking and bicycling do not result in emissions of air contaminants or greenhouse gases, so if more trips were completed on foot or bike there would be fewer illnesses and deaths associated with air pollution and less need to adapt to the impacts of climate change. Furthermore, the capital costs associated with constructing pedestrian and bicycling infrastructure are more modest than the capital costs associated with constructing motor vehicle infrastructure; and because pedestrians and bicyclists cause so little wear and tear, the costs associated with maintaining their infrastructure are low, as well. Finally, there are health benefits associated with incorporating physical activity into one's daily routine. A daily bike ride to and from work, or a daily walk to and from a grocery store, greatly reduces the likelihood of a number of serious illness such as diabetes and the costs associated with them.

To improve the quality of life in the GTHA and to ensure that the region continues to be competitive against other urban regions, it is essential that trips be shifted away from less sustainable modes of transportation, such as single-occupancy motor vehicles, and shifted toward more sustainable modes, such as active transportation.

In August 2007, Metrolinx contracted the services of the Clean Air Partnership (CAP) to prepare an overview of: a) active transportation policies, programs and infrastructure in GTHA municipalities; b) barriers to GTHA municipalities doing more to support active transportation; and c) examples of active transportation policies, programs and infrastructure from other, comparable urban regions where walking and bicycling have a larger share of the mode split.

CAP found that active transportation policies, programs and infrastructure in the GTHA lag behind that of other urban regions. There are fewer kilometres of on-road, dedicated bike lanes and off-road, multi-purpose trails in the GTHA, per capita, than in Calgary and Vancouver, for example. Similarly, very few transit buses are equipped with bike racks in the GTHA, whereas they are universal in Portland and San Francisco. Furthermore, the most innovative active transportation programming, such as bike sharing/lending programs and mass celebrations of walking and biking, are occurring elsewhere—in Montréal and Ottawa, for example—but not here.

EXECUTIVE SUMMARY CONT'D

As for why GTHA municipalities are not doing more to promote active transportation, the barrier mentioned most often by municipal staff is a lack of financial resources. Considering that many GTHA municipalities are among the wealthiest in the country, however, it is probably more accurate to say that active transportation has simply not been a priority.

Among the other challenges mentioned by staff at GTHA municipalities:

- a lack of trained and qualified staff;
- a lack of harmonized priorities between upper- and lower-tier municipalities;
- insufficient transit service with which to divert people from their cars;
- legislation that impedes the integration of walking and biking with transit;
- a disconnect between land-use and transportation planning; and
- the lack of a champion for the issue.

As for why other urban regions have been able to do more than the GTHA in promoting active transportation, the most obvious difference is that in most other jurisdictions examined there are important partners at the regional and/or provincial level that provide support: through cost-sharing programs with municipalities; through direct capital investments in parallel, regional or provincial networks; and through the provision of staff with expertise in the field.

Based on these findings, CAP recommends the following actions be taken to support active transportation in the GTHA:

1. Support should be sought for continued investment in the infrastructure necessary to better integrate active transportation with transit—ensuring that there are bike racks on all GO buses, for example, and secure bike parking at every GO station; and
2. An active transportation research program should be established to examine in greater depth the key issues identified by the research thus far, as well as any related issues identified in the future. In the short term, specific research projects might include:
 - a. A review of provincial legislation, policies and programs that may be having the unintended effect of discouraging active transportation;
 - b. An examination of other disincentives to active transportation and the development of strategic incentive programs for individuals and businesses to use active transportation;
 - c. The development of a detailed plan for an active transportation cost-sharing program between the province, Metrolinx, GTHA municipalities and other partners; and
 - d. The development of land use and transportation planning policies that will facilitate active transportation.

With these investments in policy development and capacity-building, the GTHA will take a big step toward improved accessibility, increased sustainability and a higher quality of life.

1.0 INTRODUCTION

In August 2007, the Clean Air Partnership (CAP) was contracted by Metrolinx to prepare an overview of the walking and bicycling policies, programs and infrastructure in Greater Toronto and Hamilton Area (GTHA) municipalities, and the barriers to more actively supporting these modes, collectively referred to hereafter as active transportation. A 20-question survey was developed by CAP, with input from Joe Perrotta, Director, Policy and Planning at Metrolinx, and David Tomlinson, Assistant Planner, Pedestrian and Cycling Infrastructure at the City of Toronto, and the survey was e-mailed to all 30 municipalities in the GTHA—single-tier, upper-tier and lower-tier—in early September 2007. On September 21, 2007, a reminder e-mail was sent to every municipality that had not yet responded, with the survey attached again. Thereafter, the remaining non-respondents were contacted by telephone once or twice, as needed.

As of October 25, 2007, 21 GTHA municipalities, representing 93.6 percent of the population of the GTHA, had either responded to the survey directly, or to a more limited number of questions from the survey via telephone or e-mail. The responding municipalities were: Ajax, Brampton, Burlington, Caledon, Clarington, Durham, East Gwillimbury, Halton, Halton Hills, Hamilton, Markham, Milton, Mississauga, Oakville, Oshawa, Peel, Toronto, Uxbridge, Vaughan, Whitby and York.

This report is a summary of the responses received to the CAP-Metrolinx survey, augmented by information obtained from employees of GTHA municipalities via telephone or e-mail, and by a review of the literature pertaining to active transportation in the region. For the purpose of comparison, the report also contains information about active transportation policies, programs and infrastructure in other urban regions, with particular attention paid to regions comparable in size to the GTHA, but where the mode share of walking and/or bicycling is equal to or greater. Table 1 lists the urban areas—Census Metropolitan Areas in Canada, Metropolitan Statistical Areas in the United States—chosen for the closest examination.

TABLE 1. ACTIVE TRANSPORTATION MODE SHARES IN LEADING NORTH AMERICAN URBAN AREAS

URBAN AREA	MODE SHARE		POPULATION
	WALKING	BICYCLING	
Calgary	5.9 percent	1.5 percent	1,079,310
GTHAⁱ	4.6 percent	0.8 percent	6,138,660
Montreal	6.0 percent	1.5 percent	3,635,571
Ottawa-Gatineau	6.8 percent	1.9 percent	1,130,761
Portland, OR	3.1 percent	1.6 percent	2,137,599
San Francisco	4.1 percent	1.3 percent	4,180,027
Seattle	3.1 percent	0.8 percent	3,263,497
Vancouver	6.5 percent	1.9 percent	2,116,581

Sources: Statistics Canada, U.S. Census Bureau.

While it may seem inappropriate to compare the state of active transportation in the GTHA, where winters can be cold and snowy, against that of milder urban regions, such as Portland, San Francisco, and Seattle, it is worth noting that the walking mode share in the GTHA is higher than in any of those milder urban regions, and the bicycling mode share in the GTHA is the same as that of Seattle. As Pucher and Buehler (2006) note, climate is a factor that influences mode choice, but not necessarily more so than road safety, land use patterns, car ownership rates, costs of car use, per capita income, and cultural differences. The high mode shares for walking and bicycling in Calgary, Montréal and Ottawa-Gatineau, all of which have colder, snowier winters than the GTHA, attest to that.

One final note on methodology: much smaller urban areas with high walking and/or bicycling mode shares—Kingston, Saskatoon and Victoria, in particular—were not a major focus of the research because average commuting distances in these communities are much shorter—between 4.7 km and 5.4 km, for example, versus 9.2 km in the GTHA. Walking and biking are more convenient where distances are short, regardless of the policies, programs and infrastructure in place in them.

Because the broad nature of the subject matter in the survey was more than could be explored in any depth with the available resources, specific attention was given to issues identified as priorities by GTHA municipalities in their responses to the survey: increased financial resources; more trained and qualified staff; harmonized policies and plans between levels of municipal government; improved transit service with which to attract pedestrians and bicyclists; a closer connection between land use planning and transportation; and the need for a champion of the issues surrounding active transportation. These priorities are discussed throughout the report, but at greatest length in Section 13.

2.0 DECISION-MAKING

GTHA municipalities were asked if they routinely consider the needs of pedestrians and bicyclists during their decision-making processes. All 17 municipalities responding to this question stated that they *do* routinely consider the needs of pedestrians and bicyclists during their decision-making processes. This section briefly outlines the documents that guide these decision-making processes, the people involved in the processes, and the processes themselves.

2.1 POLICY DOCUMENTS

GTHA municipalities reported a wide variety of policy documents that reflect the priority given to walking and biking. Nine (9) reported that their Official Plans contain policies and objectives related to walking and cycling, including policies that promote compact urban form, street-front oriented development and pedestrian-scaled facilities. The policy documents reported by survey respondents that seem most directly related to active transportation are listed below with date of adoption or publication, where known:

Ajax	Bicycle and Leisure Trail System Plan	2006
Burlington	Multi-Use Pathways and Bikeway Plan	--
Caledon	Trails Master Plan	--
East Gwillimbury	Trails Master Plan	--
Hamilton	Cycling Master Plan "Shifting Gears"	1999
Hamilton	Trails Master Plan	--
Mississauga	Multi use recreational trail master plan	2001
Oakville	Cycleways Master Plan	1985
Oshawa	Cycling Network Study	1999
Toronto	Bike Plan	2001
Toronto	Pedestrian Charter	2002
York	Pedestrian & Cycling Master Plan	2007

TABLE 2. ACTIVE TRANSPORTATION POLICY DOCUMENTS, GTHA MUNICIPALITIES.

A number of jurisdictions reported processes underway that will culminate in the creation of active transportation plans, including Durham (Regional Cycling Plan), Oakville (Active Transportation Master Plan), and Toronto (Walking Strategy).

2.1.1 Complete Streets Policies

Complete streets policies direct planners and engineers to design or redesign facilities with all users in mind, including pedestrians and bicyclists. While none of the GTHA municipalities responding to the survey reported having a complete streets policy, they are increasingly common in the United States. Fourteen US states, and more than fifty other US jurisdictions have adopted complete streets laws or policies (National Complete Streets Coalition 2007), among them:

California	Charlotte
Florida	Chicago
Illinois	Colorado Springs
Kentucky	Honolulu
Maryland	Iowa City
Massachusetts	Salt Lake City
North Carolina	San Diego
Oregon	San Francisco
Pennsylvania	Seattle
Rhode Island	West Palm Beach
South Carolina	Vermont
Tennessee	Virginia

A chart including key language from several complete streets policies can be found on the [National Complete Streets Coalition](#) website. An excerpt from the City of Chicago’s policy is included below, for illustrative purposes.

“The safety and convenience of all users of the transportation system including pedestrians, bicyclists, transit users, freight, and motor vehicle drivers shall be accommodated and balanced in all types of transportation and development projects and through all phases of a project so that even the most vulnerable – children, elderly, and persons with disabilities – can travel safely within the public right of way.”

2.2 STAFF AND ADVISORS

Ideally, the people involved in developing facilities and programs for pedestrians and bicyclists will have training specifically for these purposes and will receive input from people who regularly use them. Several GTHA municipalities reported having committees that advise decision-makers on walking and bicycling issues, among them:

- Burlington Cycling Committee
- Caledon Cycling Committee
- Durham Trails Coordinating Committee
- Halton - Regional Cycling Advisory Committee
- Halton Hills Trails Advisory Committee
- Hamilton Cycling Committee
- Markham - Cycling and Pedestrian Advisory Committee
- Mississauga Cycling Advisory Committee
- Toronto Cycling Advisory Committee
- Toronto Pedestrian Committee

The mandates of these committees and details of their composition was not the subject of this research.

Four (4) GTHA municipalities reported that they have staff whose full-time focus is walking, bicycling, or Transportation Demand Management (TDM): Hamilton (with 2 staff members), Markham (with 1), Oakville (1) and Toronto (15). GTHA municipalities were also

asked to estimate how many full-time equivalents (FTEs) they have devoted to these issues, a number that is determined by adding together the proportion of every staff person's time thus spent. Burlington and York each reported 2 FTEs, Mississauga 1.45, Halton Hills 0.5, and Clarington 0.075.ⁱⁱ Together, these municipalities have 25 FTEs working on pedestrian and bicycling issues and TDM, or one for every 211,500 residents. While this compares favourably to the ratio in the fifty largest U.S. municipalities, where a recent survey found an average of one bicycle and/or pedestrian professional on staff for every 357,000 residents (Thunderhead Alliance 2007), it is based on a very limited sample of GTHA municipalities and should be interpreted with caution.

According to the Thunderhead Alliance, the ratio of bicycle and/or pedestrian professionals at state Departments of Transportation is one for every 3,333,333 residents. The number of FTEs dedicated to bicycle and/or pedestrian issues at the Ontario Ministry of Transportation was not available.

2.3 PROCESSES

GTHA municipalities identified several processes where accommodation of pedestrians and bicyclists occurs as a matter of course, among them, the capital budget process and the development review process. Burlington and Hamilton reported that pedestrian and/or cyclist facilities are included in their capital budgets every year. In Hamilton, the annual budget for cycling facilities is \$300,000, to which is added bike improvements that occur as part of road construction and which average about \$200,000 per year. Hamilton also dedicates \$300,000 per year to extending the sidewalk network, above and beyond sidewalks construction that is coordinated through capital improvement projects. Uxbridge and York reported that facilities for pedestrians and bicyclists are routinely considered during the development review process, and that the decisions are guided by the content of the policy documents listed in Section 2.1.

3.0 BICYCLING INFRASTRUCTURE

Bicycling infrastructure includes cyclable facilities, such as bike lanes and trails, but also bicycle parking, and a variety of intersection treatments. For the purposes of discussion, it also includes a variety of other road treatments that may not necessarily constitute safe and attractive facilities for bicycling. Each of these types of infrastructure is discussed in detail below.

3.1 BIKE LANES AND TRAILS

GTHA municipalities were asked how many kilometres of various types of cyclable on-road and off-road facilities they are responsible for, including: on-street, dedicated bike lanes; off-road, multi-purpose trails; and other limited access facilities (e.g. clearways for bike, bus

and taxi only). The responses received were cross-referenced with and/or augmented by information drawn from the municipalities' websites. Table 3 indicates the extent of the existing network of cyclable facilities in participating GTHA municipalities.

TABLE 3. CYCLABLE FACILITIES IN GTHA MUNICIPALITIES	POP. ('000)	ON-STREET		OFF-ROAD MULTI-PURPOSE TRAILS (KM)	OTHER LIMITED ACCESS (KM)	TOTAL FACILITIES (KM)	KM PER 100,000 PEOPLE
		BIKE LANES (KM)	SHARED ROUTES (KM)				
Ajax	90.2	0.0	7.4	80.0	0.0	87.4	96.9
Clarington	77.8	0.0		11.5	0.0	11.5	14.7
Oshawa	141.6	0.0		44.0	5.0	49.0	34.6
Uxbridge	19.2	0.0		57.0		57.0	297.4
Whitby	111.2	0.0		46.7		46.7	42.0
RM of Durham ^a	561.3	0.0		n/a	0.0	0.0	0.0
TOTAL Durham Region ^b		0.0	7.4	239.2	5.0	251.6	
Burlington ^c	164.4	24.2	0.0	49.5		73.7	44.8
Halton Hills ^c	55.3	0.0		7.0	0.0	7.0	12.6
Milton ^c	53.9	0.0		21.6		21.6	40.0
Oakville ^c	165.6	18.5		145.0	0.0	163.5	98.7
TOTAL Halton Region ^d	439.3	42.7	0.0	223.0	0.0	265.7	60.5
TOTAL Hamilton	504.6	83.0		59.0	2.0	144.0	28.5
Caledon	57.1	0.0	50.0	50.0	0.0	100.0	175.3
Mississauga	668.5	18.0		208.0		226.0	33.8
RM of Peel	1,159.4	0.0		n/a		0.0	0.0
TOTAL Peel Region ^e		18.0	50.0	258.0	0.0	326.0	
TOTAL Toronto	2,503.3	69.0	118.0	326.0	20.0	533.0	21.3
Aurora	47.6	0.0	0.0	12.3	0.0	12.3	25.8
E. Gwillimbury	21.1	0.0	0.0	13.7	0.0	13.7	65.0
Georgina	42.3	0.0	27.1	9.0	0.0	36.1	85.3
King	19.5	0.0	0.0	0.0	0.0	0.0	0.0
Markham	261.6	12.0	9.1	28.0	0.0	49.1	18.8
Newmarket	74.3	0.0	0.0	5.5	0.0	5.5	7.4
Richmond Hill	162.7	0.0	0.0	0.0	0.0	0.0	0.0
Vaughan	238.9	0.0	0.0	17.2	0.0	17.2	7.2
Whitchurch	24.4	0.0	0.0	3.0	0.0	3.0	12.3
RM of York	892.4	0.0	8.5	0.0	0.0	8.5	1.0
TOTAL York Region	892.4	12.0	44.7	88.7	0.0	145.4	16.3

Notes for Table 3: ^a The acronym RM is used to refer to Regional Municipalities, also known as upper-tier municipalities. ^b Durham total does not include data from Brock, Pickering and Scugog, which did not respond to the survey. ^c Includes facilities in areas both of local and regional jurisdiction. ^d Data for facilities in Regional rights-of-way were not available separately from those in local rights-of-way in Halton. ^e Peel total does not include data from Brampton, which did not respond to this question on the survey

While these data are interesting, one should exercise caution when using them for comparative purposes because the function and quality of the facilities reported as cyclable can vary. Many off-road trails function more effectively for recreational than transportation purposes, for example, particularly if they are neither parallel to major roads nor connected to major destinations. Even where trails *are* connected to major destinations, they may be too poorly designed or maintained to function effectively as transportation corridors. Similar limitations also lurk in the data for on-street facilities, more about which in Section 3.2.1.

Another consideration to bear in mind when interpreting Table 3 is that the responsibilities and opportunities of similar-sized municipalities can be quite different. While Peel is comparable to York in population, and Durham comparable to Mississauga, neither Peel nor Durham have responsibility for parks and recreation, and therefore both have limited opportunity to build off-road trails, which is one reason why there are no cyclable facilities in areas of Peel’s or Durham’s jurisdiction. This is not to say that there are no cyclable facilities in Peel or Durham: just that those that have been installed have been installed by lower-tier municipalities.

Cities at the center of urban regions, “central cities,” are often quite comparable in terms of their responsibilities. In Table 4, the extent of cyclable facilities in a number of North American central cities is compared. Again bearing in mind the aforementioned caveats about the variability of the function and quality of cyclable facilities, Table 4 indicates that the central city of the GTHA, Toronto, lags behind the central cities of other North American urban areas in the provision of these facilities. Whereas the median ratio of cyclable facilities is 38.6 to 100,000 residents in these municipalities—i.e. 38.6 km per 100,000 residents—in the City of Toronto it is only 21.3.

	POPULATION (2006)	BIKE FACILITIES (KM)	KM BIKE FACILITIES / 100,000 POPULATION
Calgary	988,193	925	93.6
Minneapolis	369,051	145	39.3
Montreal	1,620,693	370	22.8
Portland, OR	539,950	417	77.2
San Francisco	744,041	233	31.3
Seattle	562,106	225	40.0
Toronto	2,503,281	533	21.3
Vancouver, BC	578,041	200	34.6

Sources: Jensen, Thunderhead Alliance, Vélo Québec, CAP-Metrolinx survey, League of American Bicyclists, Stary.

TABLE 4. CYCLABLE FACILITIES IN SELECTED CENTRAL CITIES

Even more telling is the comparison in Table 5 of cyclable facilities in Canada’s five largest urban regions, which indicates quite clearly that the GTHA lags behind the urban regions of Calgary, Montréal,

Ottawa-Gatineau and Vancouver. There are about 32.0 km of cyclable facilities for every 100,000 residents of the GTHA, significantly less than in Calgary (92.5), Montréal (35.4), Ottawa-Gatineau (96.0), and Vancouver (71.1).

TABLE 5. CYCLABLE FACILITIES IN CANADIAN URBAN REGIONS

	POPULATION (2006)	BIKE FACILITIES (KM)	KM BIKE FACILITIES / 100,000 POPULATION
Calgary	1,000,000	925	92.5
GTHA	6,000,000	1920+	>32.0
Montreal	3,500,000	1240	35.4
Ottawa-Gatineau	1,000,000	960	96.0
Vancouver	1,900,000	1350	71.1

Sources: Jensen, Vélo Québec, CAP-Metrolinx survey, .

In addition to a higher ratio of cyclable facilities per 100,000 residents, the urban regions of Montréal, Ottawa-Gatineau and Vancouver have in common partner agencies at the provincial and/or regional levels that assist local municipalities in providing cyclable facilities. In the Montréal area, the partner agency is *Ministère des Transports au Québec* (MTQ), which invests heavily in bicycling infrastructure. In the Vancouver area, there are three partner agencies: the Ministry of Transportation, the Ministry of Community Services and TransLink. In Ottawa-Gatineau, the National Capital Commission (NCC) is an important player on both sides of the provincial boundary while MTQ also contributes on the Québec side of the boundary. More about the role each of these agencies plays is included in Section 6.0, below.

3.2 OTHER BICYCLE-FRIENDLY INFRASTRUCTURE

A few GTHA municipalities reported providing bicycling infrastructure beyond bike lanes/multi-purpose trails and bike racks/lockers. Among the types of infrastructure reported were edge lines, bicycle-actuated traffic signals, and bicycle-friendly catch basin grates. Some GTHA municipalities also reported the used of external bike racks on their buses, which is an issue dealt with in greater detail in Section 12.1.

3.2.1 Edge Lines

Mississauga, Oakville and Oshawa reported the use of “edge lines” on some streets. In Mississauga and Oshawa, white edge lines have been painted on some streets, directing motor vehicle traffic away from the curb, and creating a space between the rightmost edge of the curb lane and the curb itself of between 1.4 and 1.75 metres, depending on the road width. The space is not for the exclusive use of bicyclists, however, and can also be used for on-street parking. While user and resident reaction has been positive—in Oshawa, at least—this treatment encourages cyclists to weave in and out of traffic between parked cars, contrary to the advice contained in the Ministry of Transportation document, [Cycling Skills](#) (2004), and contrary to the teachings of the CAN-BIKE series of courses, more about which in Section 9.3.

Toronto has also installed edge lines, on Spadina Avenue. The width of the space between the edge line and the curb varies, but is generally quite narrow. The intent of this treatment is to direct motor vehicle traffic away from the curb to create more space for bicyclists. Parking is prohibited, however, so the treatment does not have the effect of encouraging bicyclists to weave in and out of traffic between parked cars. Also, the street is not signed as a bike route.

3.2.2 Intersection Treatments

Many conflicts occur between road users at intersections. The conflicts range in severity from simple inconvenience through near-collisions to collisions. Two GTHA municipalities (Hamilton and Toronto) are experimenting with intersection treatments to reduce conflicts between bicyclists and other road users, as are several other jurisdictions beyond the GTHA.

At signalized intersections where a minor street intersects with a major street, the signal often stays green on the major street until traffic on the minor street arrives at the intersection and is detected by a sensor in the pavement, or until a pedestrian activates the signal by pressing a push button. Where the sensitivity of the sensor in the pavement has not been adjusted to detect the presence of a bicycle, bicyclists are forced to wait for the arrival of a motor vehicle, or to dismount and walk onto the sidewalk to push the button.

Since 1995, all new semi-actuated signals installed in Toronto have had the sensitivity set to detect bicycles. Hamilton reported that it is also experimenting with a bicycle-specific traffic signal loop detector design. At some intersections in Toronto, three white dots have been painted on the pavement to indicate the optimal position for a cyclist wishing to change the signal. Awareness of the significance of the white dots among cyclists appears to be low, however.

Many semi-actuated signals in Vancouver and Victoria (British Columbia) can be actuated by bicycles. At intersections in Victoria, the figure of bicycle is painted onto the pavement indicating the optimal position for cyclists wishing to change the signal, and cyclist familiarity with the treatment is high. In Vancouver, where low-volume streets with bike lanes intersect with high-volume streets, crossing buttons are positioned so that cyclists can push them and activate the signals without dismounting their bikes or leaving the road. Separate crossing buttons are provided for pedestrians at these intersections, where the signals do not actuate unless a button is pushed.

Signalized intersections in the Netherlands generally have a separate set of signal heads for bicycles, and in the Dutch city of Groningen cyclists frequently receive an advanced green signal, which reduces the risks of car-bike collisions. Advance green lights for cyclists are also employed in Copenhagen and Odense (Denmark), and Muenster (Germany) (Pucher and Buelher 2007). In addition, a number of



A CYCLIST PUSH BUTTON ALLOWS BICYCLISTS TO ACTIVATE TRAFFIC SIGNALS WITHOUT DISMOUNTING THEIR BICYCLE.

facilities have been developed to improve the flow and safety and of bicycles through intersections, among them: sensors that detect cyclists as they approach, similar to transit priority technology; and timers that indicate to cyclists how long the wait is for the next green light. Bicycle-specific signal heads are also used in Davis (California) at signalized intersections with bicycle-only phases.

At its meeting on October 23, 2007, Toronto City Council approved the trial of two strategies to improve cycling safety at intersections: “leading bicycle intervals” and “bike boxes,” both of which give bicyclists priority treatment at the intersections where they are implemented (City of Toronto 2007). While the exact function of the leading bicycle interval is unclear, it is expected to be similar to an advance green light. A bike box, on the other hand, is similar to a transit queue jumper. It is a marked area in front of the stop line for motor vehicles in a traffic lane, which a bicycle can enter during a red signal phase. When the signal turns green, bicycles in the bike box proceed through the intersection in advance of motor vehicles, in theory reducing conflicts between cyclists and motorists, and improving safety. Bike boxes, or “advance stop positions,” have already been installed in Copenhagen, Eugene (Oregon), Groningen, Muenster, Odense and Victoria.

3.2.3 Catch Basin Grates

Catch basin grates with grooves that run parallel to the roadway can trap and destroy bicycle wheels and cause bicyclist injuries. Toronto has been replacing or re-orienting catch basin grates to address this issue since the 1980s. Oakville also reported using bicycle-friendly catch basin grates.

4.0 BICYCLE PARKING



THERE ARE 15,000 POST-AND-RING RACKS IN TORONTO.

Most, but not all, GTHA municipalities reported that they provide bicycle racks or lockers. Few were able to estimate how many bicycles could be parked at the racks or in the lockers they have provided, however. Approximately 15,000 post-and-ring racks are currently in place in the City of Toronto, as well as 138 lockers, providing parking for more than 30,000 bikes. Estimates for other GTHA municipalities include 650 (Hamilton), 200 (Oshawa) and 24 (Uxbridge). These numbers represent parking spaces available only at racks and in lockers provided by municipalities, and do not include parking spaces provided by transit systems, school boards, private developers, advertisers or others.

As Table 6 indicates, the ratio of people to bicycle parking spaces in the City of Toronto is well within the norm compared to other, similar North American central cities. Some, like Minneapolis provide much more bicycle parking per capita. Others, like Calgary, provide much less. Unfortunately, bicycle parking data for wider urban regions, like

GTHA or Ottawa-Gatineau, are not available, nor are data regarding the quantities of bicycle parking provided on private property.

	BICYCLE PARKING SPACES	RESIDENTS PER PARKING SPACE
Calgary	1,600	618
Chicago	20,000	137
Minneapolis	15,856	23
Montreal	18,000	90
Ottawa	10,000	81
San Francisco	3,100	240
Toronto	30,000	83

TABLE 6. BICYCLE PARKING IN NORTH AMERICAN CITIES

Sources: Jensen, Pucher and Buehler (2006), Thunderhead Alliance, Tomlinson, Vélo Québec.

4.1 MUNICIPAL BICYCLE PARKING PROGRAMS

Most GTHA municipalities reported that decisions about how much and what types of bicycle parking to provide, and where to provide it, are made on an ad hoc basis. Exceptions to this include Hamilton, Oshawa and Toronto, where there are formal programs to install and maintain bicycle parking:

- Toronto spends between \$160,000 and \$175,000 per year on lockers and post-and-ring racks, many of them replacing racks damaged the previous year by motor vehicles mounting the curb. The facilities are provided in response to requests received from the public, and the request form is on the City's website. The annual budget for maintenance of the racks in Toronto is between \$8,000 and \$14,000.
- In Hamilton, there are two programs. One is funded by the City and has an annual budget of between \$0 and \$50,000. The other is funded by an advertising agency, which installs racks wherever it believes advertising revenues will justify it.
- In Oshawa, the City spends \$15,000 annually to replace old racks and to provide new ones.

The bike parking program in Ottawa is a public-private partnership between the City and an advertising firm. Through this partnership, between 2,000 and 3,000 racks containing advertising have been installed in the city's downtown, each with space for 3 or 4 bikes. The racks are removed during winter months so that City staff can use machines to clear the sidewalks of snow.

The bike parking program in Calgary has undergone significant changes since its inception in 2002. Initially, only businesses could request racks, which the City would then install on private property, as well as covering half of the \$300 cost. To reduce the administrative costs associated with this program, the City now manufactures its own upside-down-u racks and installs them free-of-charge on public property, by request, or at locations the City has identified itself.

Summer students are employed to identify appropriate spaces for rack installation.

Portland (Oregon) created a Bicycle Parking Fund in 2004 , providing developers an alternative to placing short-term bicycle parking on site, which had been a legal requirement since 1996. Developers whose buildings have inadequate space within 50 feet of the main entrances for bike parking are now allowed to pay a fee to the Fund, the proceeds of which are used to install bicycle parking elsewhere in public rights-of-way. The Fund currently stands at about USD\$200,000 (Roberts 2007).

4.2 END-OF-TRIP FACILITIES BY-LAWS

By-laws that compel developers to provide end-of-trip facilities—bicycle parking, change rooms and showers—are common in North America. They typically specify the quantity of the facilities to be provided, but also frequently address issues that determine the *quality* of the facilities, as well: level of protection from the elements (covered versus uncovered), for example, and level of security from theft and vandalism (attended/visible versus secluded).

Under Clarington’s zoning by-law, at least one bicycle rack must be installed for each new building, or addition to a building, in a range of commercial zones. Furthermore, any commercial development with a floor area greater than 5,000 sq m in those same zones must provide an indoor bicycle parking facility for employees. Ajax reported using an informal process to achieve similar ends on commercial developments in its downtown. During the site plan process, Ajax staff suggest developers provide bicycle racks, though there is no requirement for developers to do so in the Town’s zoning by-law or site plan manual. Voluntary compliance is high, however, because it speeds up the review process.

Toronto’s zoning by-law also specifies quantities of bicycle parking and shower-change facilities required in private developments. The by-law applies to large residential developments as well as to buildings hosting a wide range of commercial uses. In brief, the by-law and stipulates that:

- In buildings containing 10 or more dwelling units, excepting senior citizens' housing, 0.75 bicycle parking spaces must be provided for each dwelling unit, to a maximum of 200 bicycle parking spaces;
- In buildings where the combined non-residential gross floor area used for specified purposes is equal to or greater than 2,000 square metres, 6 bicycle parking spaces, or 1 bicycle parking space for every 1,250 square metres of net floor area, must be provided, whichever is greater; and
- In buildings where the combined non-residential gross floor area used for specified purposes is equal to or greater than 20,000

square metres, a shower-change facility must be provided for each gender.

Whereas Toronto's by-law is not specific about where bicycle parking should be located or what other qualities it must have, Vancouver's *Off-street Bicycle Space Regulations (2002)*, are quite detailed in this regard. Quantities of two different classes of parking are specified and the classes are clearly defined. Class A facilities, including indoor bicycle rooms, compounds and lockers, are indoors, and high security. The regulations specify that both the doors and door frames of these facilities must be constructed of steel, for example, and be within sight of security, where it exists, or an elevator, or an entrance. For Class B facilities—primarily outdoor bike racks—the regulations specify that they must be constructed of theft-resistant material and be securely anchored to the floor or ground. Further, that they be located in a convenient, well-lit area that “provides visual surveillance by occupants of the building the racks are intended to serve.”

Under Ottawa's zoning by-law, end-of-trip facilities other than bike parking—i.e. change rooms and showers—are not required, but developers are offered a reduction in motor vehicle parking requirements in exchange for these amenities. Similar incentives are also used in Bend (Oregon), Clarington, and Scottsdale (Arizona).

A partial list of other North American municipalities that have end-of-trip facilities requirements includes: Burnaby (BC); Calgary (still in draft format); Denver; Madison (Wisconsin); Portland (Oregon); San Francisco; and Vancouver.

Even where end-of-trip facilities are required by law in private developments, monitoring and enforcement may be neglected and compliance low. Parking for several thousand bicycles *should* have been provided under Ottawa's by-law, for example, however no inventory has ever been completed to determine the level of compliance. In other jurisdictions, stories circulate about condo boards deciding to convert bike lockers installed in compliance with by-laws into storage facilities and charging thousands of dollars for their use.

4.3 BIKE STATIONS

Secure parking can have a major impact on the number of people bicycling. The number of students biking to Johan de Witt College, in The Hague (Netherlands), for example, increased ten-fold after a guarded parking facility was installed (Ministry of Transport, Public Works and Water Management 2007).

Bike stations are secure areas where people can leave their bikes for extended periods of time, often for the duration of a working day, or overnight between work days. Bike stations are most appropriate for high-density areas where many commuters converge, such as transit

terminals. They make sense where motor vehicle traffic is congested, transit vehicles are crowded, or circumstances dictate that a bicycle can be used for one leg of a commute, but not the other. Some are staffed, providing an extra layer of security and a variety of related services during the off-peak, midday period: bike repairs, for example, or bike rentals.



BICYCLE PARKING IN
AMSTERDAM.

While there are no bike stations in GTHA, they are common in Europe and Japan, and gaining ground in the United States. Bike stations vary in size from modest—the one in Palo Alto (California) can accommodate 96 bicycles—to immodest: in Amsterdam and Leiden (the Netherlands), each has room for about 10,000 bikes. Bike stations in Groningen (the Netherlands) and Munster (Germany), are somewhere between, with spaces for 4,000 and 3,300 bikes each. And, while the bike station in Groningen is staffed and its expenses covered in part through an annual membership fee of \$50, in Palo Alto the bike station is not staffed and access is via an electronic key.

Among the other U.S. cities with bike stations are Long Beach, Seattle and Chicago. The City of Montréal has proposed the installation of two large and three smaller bike stations—*stations pour vélos*—in its downtown core.

4.4 PARK 'N' BIKE

Calgary's seven Park 'n' Bike lots are similar to park-and-ride lots at transit stations, except motorists bring their bike inside or attached to their car, park their car for free, then bicycle into town rather than taking transit. Park 'n' Bike sites are located at underutilized parking lots in recreational areas, at a distance of 5 to 8 km from downtown. The distance was chosen based on the results of market research which determined that many Calgarians wanted to ride to work for health reasons and were willing to do so for about 11 km per day. There is no overnight bike parking at Park 'n' Bike sites.

A similar program exists in Amsterdam, where for a fee, a motorist receives parking and a rental bicycle for the day. Sixty percent of the eighty bicycles available through this program are in use on a typical summer day (Pucher and Buelher 2007).

5.0 BICYCLIST-FRIENDLY POLICIES

Municipalities can adopt a variety of policies that are bicyclist-friendly, including bicycling plans or complete streets policies, as discussed in Section 2, above. In this section, other bicyclist-friendly policies adopted by municipalities in GTHA and elsewhere will be discussed, including a policy of creating wide curb lanes for shared bicyclist-motorist use.

5.1 CYCLABLE FACILITIES

A handful of GTHA municipalities reported having policies that should increase the extent of their cyclable facilities as a matter of course. The policy in York is that for all 6-lane roads, bike lanes must be included in the road design. In Burlington, the design standard for new arterial roadways includes both on-road bike lanes and an off-road multi-use path, with the ultimate objective being that all arterial roads will eventually have on-road bike lanes. Burlington, alone among GTHA municipalities, has a policy to allow bicycling on its sidewalks.

In Halton, it is policy to stripe 4.2 m wide curbs lanes for more comfortable motor-vehicle and bicycle interaction. Calgary has a similar policy, that all new arterials are striped with a curb lane that is 4.3 m wide, and that curb lanes on reconstructed streets are made as wide possible, though the actual width varies. None of the arterials in Calgary are signed or stenciled as bike routes, because, as high volume streets where the speed limit is 70 kph, they may not be a very comfortable place to ride, even with the wider curb lane. Even faster traffic may be the ultimate impact of wide curb lanes on streets where traffic volumes and speeds discourage cycling.

5.2 ROAD MAINTENANCE

The impacts on bicyclists of debris on the road are much more severe than on motorists. Broken glass, for example, frequently punctures bicycle tires, but usually has no effect on motor vehicle tires. Similarly, while loose gravel can cause a cyclist to lose control of their vehicle, it wouldn't even be noticed by a motorist in most instances. The negative impacts on bicyclists of debris are compounded by the tendency of debris to collect where bicyclists ride, at the margins of the roadway, much of it "swept" there in the wake of passing motor vehicle traffic.

Some jurisdictions take actions to mitigate against the hazards to bicycling posed by debris. In Seattle, streets with bike lanes are cleaned one more time each month than are similar roads without bike lanes. In Boulder (Colorado), streets with bike lanes are cleaned at least twice per week, weather permitting and on an "on-call" basis. Even during winter, on-street bike lanes in Boulder receive attention and are cleared during regular snow removal operations, except in cases where there is too much of a build-up along the curb and gutter.

Similarly, Montréal has created *le Réseau Blanc*, a network of streets in the downtown core that are kept in cyclable condition during winter.

Alone among GTHA municipalities, Hamilton reported that its streets with bike lanes receive more frequent street cleaning service than other similar streets.

6.0 PROVINCIAL AND REGIONAL FUNDING PROGRAMS FOR BICYCLING

As discussed in Section 3.1, above, funding for bicycling infrastructure and programming is provided by provincial and/or regional agencies in other leading urban areas of Canada, the details of which are discussed in this section. Also discussed in this section is *Trails for Life*, a granting program administered by the Ontario Ministry of Health Promotion, and York Region's Municipal Partnership Program, the only comparable programs available to provide funding to GTHA municipalities at present.

6.1 NATIONAL CAPITAL COMMISSION (OTTAWA-GATINEAU)

The National Capital Commission (NCC) is a Crown corporation that acts as the steward of federal lands and buildings in the National Capital Region, an area roughly contiguous with the Ottawa-Gatineau CMA. The NCC has developed and maintains a 150 km network of off-road, multi-purpose trails, most of which is paved. Though the NCC's network was never intended to serve commuters and indeed is marketed as a recreational amenity and tourist attraction, most trails radiate out from the downtown core, making them convenient for commuting purposes. Local municipalities have installed approximately 50 km of their own off-road, multi-purpose trails that connect with those of the NCC (Charbonneau 2007).

During summer months, the NCC also closes 50 km of park roads on Sunday mornings and turns the space over to bicyclists and in-line skaters. The operating costs of this event are underwritten by a private sector sponsor.

6.2 MINISTÈRE DES TRANSPORTS AU QUEBEC

The *Ministère des Transports au Québec* (MTQ) adopted a bicycle policy in 1995 mandating that all provincial transportation infrastructure projects must incorporate bike facilities where specified in regional and municipal land use and development plans. At the same time, MTQ agreed to help fund *la Route Verte*, a 4,000 km, province-wide bicycling network proposed by Vélo Québec, a non-profit association working for cyclists in Québec. While marketed more for tourism and recreational purposes, significant parts of the network

are on municipal roads, including those in the Gatineau and Greater Montréal areas.

La Route Verte was developed between 1996 and 2007 and officially inaugurated in August of this year. Construction costs for the project were provided by the following sources:

- On provincial roads
 - MTQ spent \$61.0 million on facilities, mostly paved shoulders and bikeways across bridges;
- In areas of municipal jurisdiction
 - MTQ granted municipalities and other stakeholders over \$22.6 million through the application-based Development Assistance Program, under which the ministry covered 25 percent of the costs of individual projects;
 - Other provincial ministries covered approximately 25 percent of the costs; and
 - Municipalities and others covered the remaining 50 percent.

During the same period, MTQ spent a further \$15.0 million on biking facilities on provincial roads that are *not* part of *la Route Verte*.

On the operating side, MTQ has earmarked \$1.7 million per year for maintenance of the parts of *la Route Verte* that are in areas of municipal jurisdiction, costs which are to shared 50-50 between the MTQ and the municipalities. Since 1996, MTQ has also paid Vélo Québec approximately \$400,000 for various services, including management of *la Route Verte* project, and the publication of resource materials such as *Technical Handbook of Bikeway Design* and the *L'État du Vélo au Québec en 2005*, for which Québec municipalities also contributed funding. Finally, MTQ also employs eighteen part-time bicycling coordinators, including at least one in every regional office. The bicycling coordinators manage the province's grant programs for the municipalities in their region and act as a source of information on issues such as bikeway design standards (Panneton 2007).

6.3 BRITISH COLUMBIA MINISTRY OF TRANSPORTATION

The British Columbia (BC) Ministry of Transportation is investing heavily in active transportation infrastructure through three programs: the Cycling Infrastructure Partnerships Program; the LocalMotion program; and the Gateway Program (Callender 2007).

6.3.1 Cycling Infrastructure Partnerships Program

The BC Ministry of Transportation launched the Cycling Infrastructure Partnerships Program (CIPP) in 2004 to promote transportation cycling. The CIPP is a cost-sharing program between the Province and BC municipalities, under which the construction costs of new cycling infrastructure are shared 50-50. To ensure that money is spent

only on projects that are implemented, costs associated with planning and land acquisition are not eligible. Municipalities can receive up to \$250,000 in CIPP funding per project, but must have an approved Bicycle Network Plan before applying. Since its inception, the CIPP has disbursed \$5 million to help implement 53 projects. In 2007-2008, \$1.7 million have been made available by the Province for the CIPP.

The CIPP can be seen as a successor to the Cycling Network Program, a BC Ministry of Transportation program, now discontinued, that provided \$12.5 million in funding for the development of 218 projects between 1995 and 2003.

6.3.2 LocalMotion

The BC Ministries of Transportation and Community Services together launched the LocalMotion program in 2007 to help fund capital projects including bike paths, walkways and accessibility improvements for people with disabilities. Through LocalMotion, the Province is investing \$40 million over four years in 50-50 cost-sharing grants to local governments. While the focus of the program is recreational, on-road transportation cycling facilities are eligible: in fact, the City of Victoria has already been awarded \$585,047 to reconstruct a section of arterial road with bike lanes and sidewalks.

6.3.3 The Gateway Program

The Gateway Program was established by the BC Ministry of Transportation in response to traffic congestion in the Vancouver area. While the Program's main focus is the widening of existing highways and the construction of new ones, \$50 million has been set aside for pedestrian and bicycling infrastructure—sidewalks and bike lanes on bridges, for example, and overpasses or other treatments where highways intersect with major roads. A further \$10 million has been made available by the Province for a cost-sharing program to encourage Vancouver-area municipalities to link their active transportation infrastructure with the active transportation infrastructure being constructed through the Gateway Program.

6.4 TRANSLINK (METRO VANCOUVER)

TransLink, or the Greater Vancouver Transportation Authority, has a wide range of responsibilities in the Vancouver area, including transportation planning, administering the contracts of transit service providers, and managing capital projects. While TransLink's primary focus is urban transit, it also has a bicycle program with an annual budget of \$6 million.

Approximately \$2.5 million of bicycle program money is granted to local municipalities each year for on-street bike lanes, off-road multi-purpose trails, and, in the very smallest cities, bicycle parking. Grant amounts are generally closely related to municipal population, but a small portion of the money is set aside for municipal projects of regional significance, for which municipalities must compete. For

access to a share of either pot of money, municipalities need to apply. TransLink funds up to 50 percent of the costs of any one project.

TransLink spends the other \$3.5 million of bicycle program money each year on its own infrastructure and programming, much of which goes toward paying the cost of building a bicycle bridge connecting Vancouver and Richmond. TransLink invests in bike lockers and in cycling instructional courses provided by the Vancouver Area Cycling Coalition (VACC), a non-profit organization that works to improve conditions for cycling in the Vancouver area.

Finally, TransLink also has a Transportation Demand Management program.

6.5 ONTARIO MINISTRY OF HEALTH PROMOTION

The Ontario Trails Strategy was launched by the Ontario Ministry of Health Promotion in 2005 to support the development and use of trails—broadly defined to include sidewalks and on-street bicycle routes—province-wide. Thus far, a coordinating committee has been established, a review of legislation affecting trails has been undertaken, and agreements have been signed that will see Ontario's trails mapped and a central trails website created. As part of the Strategy, a provincial granting program, Trails for Life, was established with up to \$440,000 to disburse annually for five years. Municipalities and Public Health Units are eligible to apply, as long as they are working in partnership with provincial trails organizations. Grants awarded under this program in 2006-2007 were generally directed toward building leadership capacity, preparing plans and promoting existing trails. No GTHA municipality was granted funding, although some GTHA-based organizations were.

6.6 YORK REGION

Under York Region's Municipal Partnership Program, the Region will share up to 50 percent of the construction costs for qualifying pedestrian and cycling infrastructure projects, which do not include bike lanes on Regional roads, sidewalks within Regional road allowances, or recreational trails. The focus will be on facilities in areas under the jurisdiction of lower-tier municipalities. Lower-tier municipalities and stakeholder groups in York can apply to the program for support only after design studies for a project have been completed and the proponent's share of the funding has been secured. The budget for the program in 2007, its first year, is \$500,000.

7.0 PEDESTRIAN-FRIENDLY INFRASTRUCTURE

GTHA municipalities were asked about the length of the sidewalks they have provided and about any other types of pedestrian-friendly infrastructure in use. Among the types of infrastructure reported were a variety of traffic calming strategies, countdown pedestrian signals, and mid-block crossings.

7.1 SIDEWALKS

Table 7 indicates the extent of the existing network of pedestrian facilities in the GTHA municipalities participating in the survey. In a municipality where there are sidewalks on both sides of every street, the ratio of pedestrian facilities to roads would be at least 2.0, a ratio that no GTHA municipality approaches. However, in many GTHA municipalities, a pedestrian-facilities-to-roads ratio of 2.0 may not be a reasonable expectation. In largely rural municipalities, such as Caledon, East Gwillimbury and Uxbridge, for example, a significant proportion of the road network traverses farmland or other green space. Given the relative lack of people to use them and the distances entailed, sidewalks may not be appropriate in these places. Other GTHA municipalities, particularly upper-tier municipalities, may not be responsible for the provision of sidewalks, or may have limited responsibilities in this regard. These considerations should be borne in mind when interpreting the data below. Notwithstanding this, it appears that there is room for improvement in the provision of sidewalks and other pedestrian facilities in GTHA.

TABLE 7.
PEDESTRIAN
FACILITIES IN
GTHA
MUNICIPALITIES

	SIDE- WALKS (KM)	OFF-ROAD, MULTI- PURPOSE TRAILS (KM)	TOTAL PEDESTRIAN FACILITIES (KM)	ROADS (KM)	RATIO OF PEDESTRIAN FACILITIES TO ROADS
Caledon	120.0	50	170.0	718.0	0.2
East Gwillimbury	62.2	13.7	75.9	182.8	0.4
Hamilton	2,298.0	59	2,357.0	3,000.0	0.8
Oakville	880.0	145	1,025.0	739.0	1.4
Toronto	7,100.0	326	7,426.0	5,500.0	1.4
Uxbridge	40.0	57	97.0	321.0	0.3
Whitby	438.0	46.7	484.7	465.0	1.0
York	477.2	47.8	525.0	1,028.0	0.5

7.2 OTHER PEDESTRIAN-FRIENDLY INFRASTRUCTURE

Traffic calming strategies—bump-outs, mini-roundabouts and raised crosswalks, for example—are used to slow down vehicular traffic, improving safety for road users and passersby and reducing the negative impacts of vehicular traffic on their surroundings, including noise and vibration. Given that three of the four aspects liked least about walking in Ontario—car exhaust, dangerous street crossings and traffic noise—result from motorized transportation (Energy Probe

1989), traffic calming is an important part of supporting walking. Most GTHA municipalities reported that they are using these strategies.

Most GTHA municipalities also reported having installed pedestrian countdown signals. Although no municipality specified what percentage of their signalized intersections are currently equipped this way, Toronto expects to have this technology deployed at every intersection by 2009. In addition to being widely appreciated by pedestrians, countdown heads have been found in pilot projects to reduce:

- the percentage of pedestrians still in the crosswalk when the signal turns red;
- the percentage of pedestrians running or aborting their crossings;
- the percentage of observed vehicle/pedestrian conflicts (Markowitz et al 2006).

A few GTHA municipalities (Burlington, Hamilton, Oakville) reported having installed mid-block crossings, which reduce trip lengths for pedestrians in certain circumstances. One large municipality specifically stated that it had none.

Burlington reported that it has a sidewalk standard that provides a smoother-than- standard walking and riding surface.

Interestingly, two municipalities listed “channelized pedestrian islands” or “pedestrian refuge islands” as being pedestrian-friendly infrastructures, which is often not how they are perceived by pedestrians. Similarly, a third municipality reported as pedestrian-friendly pedestrian overpasses across roads, even though they add distance and an incline to walking trips, often making them less attractive.

8.0 PEDESTRIAN-FRIENDLY POLICIES

Municipalities can adopt a wide range of policies that are friendly to pedestrians. Policies about how to pay for the construction and repair of sidewalks, for example, can have a significant impact on whether they are built or maintained. Policies about sidewalk snow removal can have an impact on how safe and inviting walking is as a travel option during winter. Policies about the mix and density of land uses, the connectivity of streets, and the presence of street furniture, can have an impact on how pleasant walking is in any weather. These are the issues addressed in this section.

8.1 SIDEWALK CONSTRUCTION AND REPAIR

Two GTHA municipalities, Burlington and Oakville, reported having policies regarding the installation of sidewalks. Burlington's design standard, for arterial roadways only, is to have on-road bike lanes, a

standard sidewalk on one side of the right-of-way and a multi-use pathway on the other side of the right-of-way. Oakville's policy is to ensure that every new street being built will have a sidewalk on at least one side.

Various mechanisms can be used to cover the capital costs of installing new sidewalks in the GTHA. Municipalities can require developers to pay directly, as in Oshawa (local roads only) and Clarington, or indirectly, through development charges, as in Ajax Clarington, Oakville and Oshawa (regional roads only). Municipalities can also raise funds for new sidewalks through the general local municipality levy against all assessed property, as in East Gwillimbury. Finally, municipalities can raise funds to pay for new sidewalks through a special local municipality levy against the properties receiving direct benefit only.

GTHA municipalities typically raise funds to repair and maintain sidewalks through the general local municipality levy. This is in marked contrast from the situation in many U.S. municipalities, including New York City and Portland, where the costs of maintaining sidewalks are borne by the adjacent property owners.

8.2 WINTER MAINTENANCE OF SIDEWALKS

During winter, sidewalks in GTHA are occasionally snow-covered or icy, both of which pose a challenge for anyone wishing to walk. In a 1989 study of the walking habits of Ontarians, unshovelled sidewalks ranked fourth on a list of aspects of walking liked least by Ontario pedestrians.ⁱⁱⁱ Some municipalities, recognizing this challenge, take steps to deal with it.

GTHA municipalities report a wide range of winter maintenance policies for sidewalks. In some municipalities—Clarington, for example—adjacent property owners are expected to clear snow from sidewalks. In others, the municipality clears snow from some, but not all sidewalks. Fifty-five percent (55 percent) of the sidewalk inventory in Mississauga, for example, is cleared by the City. In Halton Hills, it is 50 percent, including all bus stops, and in East Gwillimbury it is 20 percent. Hamilton clears snow from sidewalks in a limited area, and Oshawa clears snow from sidewalks in limited circumstances. In 2006, for example, snow was removed from the sidewalks only once in Oshawa, and even then only in the downtown area.

Both Markham and Oakville reported that they clear snow from *all* sidewalks in their jurisdictions, but the circumstances in which this happens varies. In Markham, sidewalks on major roads in urban areas are ploughed within 24 hours of the end of a snowfall when snow accumulations reach 5 cm or greater; and local roads in urban areas and all roads in rural areas are ploughed when snow accumulations exceed 7.5 cm. In Oakville, sidewalks are also cleared when snow accumulates in excess of five cm, but only *after* roads are cleared.

A recent scan of winter maintenance policies for sidewalks in southern Ontario municipalities can be found on the [City of Oakville](#) website. A useful entry-level document, its focus is a) programs to assist seniors with snow removal and b) programs to clear windrows—i.e., accumulations of snow deposited across the entrances to driveways after ploughing.

8.3 TRANSIT-ORIENTED DEVELOPMENT

“Smart growth” is a term used to describe a pattern of urban development in which different land uses—particularly residential and commercial—are intermingled and where densities of residents and jobs are high. Buildings tend to be street-front oriented in smart growth developments rather than surrounded by moats of parking, and facilities of all types tend to be pedestrian-scaled. Because of the proximity of the various land uses, and the bustling, but not overwhelming environment created, many daily activities can be and are conducted on foot in developments designed according to smart growth principles. Transit Oriented Development (TOD) is a variant of smart growth in which the development is typically centered around a high-order transit facility, such as a subway or commuter rail station.

In 2006, the province of Ontario released the *Growth Plan for the Greater Golden Horseshoe*, a land-use plan for a wide swath of central Ontario, including GTHA. The Plan mandates development patterns in which residences and jobs are at higher densities, and which “support[s] transit, walking and cycling for everyday activities” (Ministry of Public Infrastructure Renewal 2006). Under the terms of the *Places to Grow Act* (2005), where there is a provincial growth plan, the plans of local municipalities must conform to it.

Alone among the GTHA municipalities responding to the questionnaire, Vaughan reported already having pedestrian-friendly development policies. According to Wayne McEachern, Manager of Policy Planning/Urban Design for Vaughan, greenfield development in his municipality has been at densities equal or greater than those stipulated in the *Places to Grow Act* since 1995. The City has also instituted a grid of north-south and east-west collectors and arterials, spaced so that no home is more than 300 m, straight as the crow flies, from a major street where direct, effective transit service is or could be offered.

9.0 ACTIVE TRANSPORTATION PROGRAMS

GTHA municipalities support an extremely wide range of educational and promotional programming aimed at encouraging active transportation, to which, no brief overview like this report could do justice. Selected programs from the GTHA and beyond are highlighted below.

9.1 ACTIVE AND SAFE ROUTES TO SCHOOL

A 2001 survey of more than 2,000 Ontario students found that 72.2 percent of children would prefer to walk or bike to school, significantly more than the 61.2 percent that already are walking or biking to school. The disparity between those who would prefer to bike to school (26.8 percent) versus those who already do bike to school (3.5 percent) was even greater. As for why fewer children are using active transportation for trips to and from school than would like to, a 1998 survey of parents nation-wide found that the two main concerns about children walking to school were busy traffic/bad drivers (cited by 55 percent) and no sidewalks/poor roads (19 percent) (York Centre for Applied Sustainability 2001).

One way that these safety concerns are currently being addressed is through the busing of students to school. Under the *Education Act*, school boards are required to provide transportation to students: if the student is under the age of seven and their home is more than 1.5 km from the nearest school; if the student is between the ages of seven and nine, and their home is more than 3.1 km from the nearest school; and if they are ten years of age or older and their home is more than 4.7 km from the nearest school. In reality, however, eligibility requirements for busing are more generous at most GTHA school boards. The majority provide yellow bus service for students up to Grade 8 (i.e. 13 years of age) if their homes as little as 1.6 km (a twenty or thirty minute walk) from the nearest school. In Hamilton, Catholic school board students of all ages are eligible for yellow bus service if they live more than 1.5 km from their nearest school.

An alternative to busing is provided by Active & Safe Routes to School (ASRTS), a community-based initiative coordinated by Green Communities Canada, that promotes walking, biking, rollerblading and skateboarding to and from elementary schools. ASRTS promotes a variety of programs including Walking School Buses, the IWALK Club, and International Walk to School Month. Together the various ASRTS programs are estimated to have resulted in 500 fewer tonnes of greenhouse gas emissions during the 2005-2006 school year, with funds raised from various sources and 1,500 volunteers (Kennedy 2007).

ASRTS is active in all four regions and both single-tier cities in GTHA, with Public Health Units frequently in the lead role. Public Health Units

in both Durham and Peel, for example, reported approaching all schools in their jurisdictions about ASRTS programming every year.

The Way to Go! Program in British Columbia, which is sponsored by the province's automobile insurance brokers, is similar in approach to ASRTS.

Green Communities Canada is now promoting the closely-related initiative School Travel Planning, which brings together community stakeholders to identify barriers to active transportation for each school and develop a written action plan. School Travel Planning is more developed in Australia, New Zealand and the United Kingdom, where the national governments provide funding and school travel advisors are in place (Green Communities 2007).

As part of Seattle's Safe Routes to School program, 3 to 5 "Focus Schools" are selected each year for receipt of up to USD\$70,000 to improve pedestrian and bicycle safety nearby. The funds can be spent on infrastructure improvements, such as new sidewalks, as well as on education, promotion, and enforcement. In addition, Seattle's "Mini-Grant Program" provides grants of up to USD \$1,000 grants to schools to create Safe Routes to School Teams, plan and promote Safe Routes events, create incentive programs, and purchase safety gear for school patrols.

Another strategy to increase the number of children walking and biking to school is to limit or ban the stopping and/or parking of private vehicles near schools. Parents and senior-level students alike are banned from driving to Kesgrave High School in Essex (United Kingdom), where parking facilities were deliberately left out of construction plans in 2001. Sixty (60) percent of senior-level students now cycle to the school (CTC 2002). Similarly, where school parking lots have been closed to parents in Dorset County (United Kingdom), there have been significant increases in the number of students walking. At other schools in Dorset, parents must pay a fee to bring their cars onto school property with the revenues dedicated to School Travel Planning (Smith 2007). Health care professionals and others have advocated that these and similar approaches be applied more systematically in the New Zealand and the United Kingdom.

In North America, less coercive strategies are generally pursued. Morton Way Public School, in Brampton, for example, is using persuasion to reduce the number of children driven to school through a '25 Cars or Less' outreach campaign.

9.2 20/20 THE WAY TO CLEAN AIR

20/20 The Way to Clean Air is a campaign coordinated by the Clean Air Partnership and delivered by Public Health Units across the Greater Toronto Area and Simcoe-Muskoka. It is not currently active in Hamilton. CAP distributes free 20/20 planners that describe practical actions to reduce personal vehicle and home energy use

while saving money. Public Health Units perform outreach to schools and present lunch-and-learn sessions at workplaces. A recent survey of households participating in transportation reduction activities in the 20/20 planner found an average reduction in vehicle km travelled of 18 percent. Walking and cycling were most commonly reported methods of reducing km driven (Toronto Public Health 2006).

9.3 CYCLING EDUCATION

CAN-BIKE is a nationally standardized set of courses on cycling safely on the road that is taught by nationally certified instructors at a variety of organizations, but coordinated by the Canadian Cycling Association. At least three GTHA municipalities offer CAN-BIKE course or support organizations that do: Hamilton, Markham and Toronto. Two-hundred-and-fifty (250) adults, youth and children took one of the CAN-BIKE courses offered in Markham in 2007. Numbers were not available for the other communities

Whereas advanced CAN-BIKE courses for adults can be as much as four days in duration, the Commuter Cycling Skills Course taught by the Vancouver Area Cycling Coalition (VACC), which is similar in content, is only seven-and-a-half hours long. The VACC's course is modeled on courses offered by the Greater Victoria Bike To Work Society and, like CAN-BIKE courses, combines classroom and on-road training. The VACC is currently able to offer its courses free of charge due to support from TransLink and the cities of Burnaby and Vancouver.

The City of Corvallis (Oregon) provides a week-long course in bicycle riding for all local fifth graders and, in Palo Alto, all elementary and middle schools participate in a bicycle safety education program, for which the City and local school district provide a part-time coordinator. Similarly, in Denmark, Germany and the Netherlands, all school children receive mandatory training in safe cycling by the third or fourth grade (Pucher and Buehler 2006).

Also, in Amsterdam and Denmark, educational programs are now being offered for newcomers who may come from societies where bicycling is viewed as gender-specific or as signifying poverty and backwardness, with the program in Denmark being operated by the Red Cross. Learning how to ride a bike can be liberating, and connecting with instructors and other learners can reduce isolation and, in tandem with the physical activity involved, reduce the risk of depression among new arrivals.

9.4 SHARE-THE-ROAD MESSAGING

Unlike cyclist education whose message is aimed only at bicyclists, share-the-road messaging is aimed at raising the awareness of all road users of each other's rights and responsibilities, which is appropriate considering that an extensive review of car-bike collisions by the City of Toronto (2003) determined that behaviours of all road

users contributed to crashes. Share-the-road campaigns can also improve the acceptability of bicycle infrastructure investment among the general population. While no GTHA municipality reported that it is promoting share-the-road messaging at present, the City of Toronto ran a campaign a few years ago, which included the placement of share-the-road posters in bus shelters and on other City-owned infrastructure.

Calgary recently launched a share-the-road campaign comprised of radio and newspaper ads, as well as busboard and other ads on transit vehicles and in transit shelters. The campaign seems to be focused around a slogan and there does not appear to be any supporting literature available to explain the message. In Arizona, the City of Tucson and Pima County worked together to create share-the-road literature that has been distributed to the police, schools, libraries, bike shops, council offices and private businesses throughout the region.

Finally, Saskatoon has also created a basic, but effective share-the-road flyer that was originally distributed with municipal water bills to all local residential and commercial accounts, and is now available [online](#). For a month after the flyer was released, the City received calls every day from people double-checking to be sure that the flyer was truly accurate (Cook 2007).

9.5 EVENTS

GTHA municipalities organize, promote and host a wide variety of events that celebrate active transportation. In Toronto, the streets of Kensington Market are closed to motor vehicle traffic on the last Sunday of each month during summer for an event known as Pedestrian Sundays, or P.S. Kensington, which began in 2004. The costs associated with the six one-day events in 2007 were estimated at \$20,000, and included the purchase of insurance, the rental of barricades, and the deployment of police (Bambrick 2007). Streets are for People, the organizers of P.S. Kensington, expanded their programming in 2007 to two other Toronto neighbourhoods: Baldwin Village and Mirvish Village. A report approved by Toronto City Council at its October 23, 2007 meeting, recommended that staff develop criteria for this type of event, and identify resources to assist in their implementation and promotion.

Similar events, on a much larger scale, are regularly held in other urban areas around the world, including Sunday Bike Days in Ottawa-Gatineau, previously referred to in Section 6.1, and in Paris (France), Rome (Italy), Westchester County (New York) and Guadalajara (Mexico). The largest of these events is Ciclovía in Bogotá (Colombia), where 120 km of streets are reserved for human-powered activities every Sunday and Holiday, between 7 a.m. and 2 p.m. About 1.5 million Bogotanos participate in Ciclovía each week. Other than at major intersections, where police are deployed, supervision is provided largely by volunteers (Peñalosa 2007).



CICLOVÍA IN BOGOTÁ

Mandated policing costs are often a barrier to events that involve temporarily restricting motor vehicle access to streets. Chicago hosts a regular Sunday bike ride, for which one day's budget is equal to that of Ottawa-Gatineau's for an entire year, largely because Chicago police must be present at every intersection. This is an issue in Toronto, as well, where a Clean Air Partnership proposal to launch an active transportation event called Active SunDays, included estimated policing costs of \$336,000 for four four-hour events.

9.6 BIKE SHARING

Modern bike-sharing programs make large fleets of bicycles available to program members from a large number of "stations" in a small, high-density geographical area. Members pay to join and also pay a time-based fee each time they use a bike, quite unlike many of earlier bike-sharing programs, which were frequently free-of-charge and run by volunteers.

While no GTHA municipality currently has a bike-sharing program, a non-profit, the Community Bicycle Network, operated the BikeShare project in Toronto for five years ending in 2006. At its peak, 150 refurbished, low-tech, yellow BikeShare bikes were available to members from 18 hubs in downtown Toronto. BikeShare member fees were low, and users were not charged a fee each time they used a bike. The project relied on grants and sponsorships for most of its operating revenue and was unable to secure enough of either to continue.



DISTINCTIVE VÉLO'V BIKES IN LYON

Lyon, the third largest city in France, has a bike-sharing program known as Vélo'v, which makes 4,000 high-tech bikes available to program members at stations located about 300 m apart, on average. To ensure against bicycle theft, prospective members must submit credit card information and pay a €150 deposit. After the initial half-hour of each use, which is free, users must pay a fee based on the type of membership they hold. For short-term members, whose member cards are valid for 7 days, the user fee is €1 for the next 60 minutes and €2 for each subsequent hour, up to a maximum of 24.5 hours. For long-term members, whose member cards are valid for one year, the user fees are lower, at €0.50 for the next 60 minutes and €1 for each subsequent hour, again up to 24.5 hours. Ninety-five percent (95 percent) of the 20,000 daily uses are free. Vélo'v has already had a major impact: motor vehicle traffic has dropped by 4 percent in Lyon and overall bicycle use has tripled (Anderson 2007). The capital and operating costs of Vélo'v are borne by an advertising firm, JC Decaux, which also forwards the fees it collects to the local government. In exchange, the local government has granted Decaux the right to sell advertising space in its bus shelters. It is expected that the program will cost Decaux €7.2 million per year to operate (Å hAnluain 2005).

The company has begun a similar program in Paris, called Vélib', which will comprise 20,600 bikes and 1,451 high-tech, self-serve bike

stations—again about 300 m apart, on average—by the end of 2007. Decaux will pay start-up costs of about \$133 million and employ 285 full-time equivalents to operate the system for 10 years. As in Lyon, all collected fees will be remitted to the city, which will also receive an annual fee of about \$5 million. In exchange, Decaux has the exclusive right to sell advertising on 1,628 billboards in the city. It is expected that 250,000 trips will be taken on Vélibre bikes each day, representing 91 million trips over the course of a year.

A bike-sharing program is also in the works for Montréal, with the start-up scheduled for the autumn of 2008. The program will be run by the city's parking authority, whose automated parking meters are similar to the machines that will be needed for a self-serve bike-sharing program. Montréal's program will involve 2,400 bikes, available at 300 stations around town. The parking authority is expected to invest \$15 million to get the project going, which is expected eventually to be self-sustaining.

10.0 TRANSPORTATION DEMAND MANAGEMENT (TDM)

Transportation Demand Management (TDM) is a generic term for strategies used to influence commuter behaviour. Broadly speaking, the objectives of TDM are to: increase the use of more resource-efficient alternatives to single occupant motor vehicles (SOVs), such as walking, biking and transit; maximize the use of less congested travel times and routes; and reduce trip frequency and distance. In doing so, TDM is intended to maximize the utilization of existing infrastructure and delay or eliminate the need for costly physical investments.

Smart Commute is a TDM partnership between the municipalities of the GTHA that helps private and public sector employers and employees explore different commuting choices. Smart Commute is comprised of an umbrella organization called the Smart Commute Association (SCA), and ten Transportation Management Associations (TMAs), each serving a distinct geographical area. Most large and some smaller GTHA municipalities are partners in the program.^{iv}

The regions, Durham, Halton, Peel and York, plus the single-tier cities of Hamilton and Toronto, provide financial support for the SCA and their local TMAs. Some lower-tier municipalities in the regions—Vaughan, Mississauga, Markham and Richmond Hill—also provide financial support for their local TMAs, although at varying levels. In-kind support in the form of advisors is provided by various municipalities, including Hamilton and York, which reported staff representation on the SCA's Steering and Technical Committees. York is also the SCA's lead administrative and legal body. Finally, Toronto provides in-kind support to SCA in the form of office space.

Some GTHA municipalities also contract service from one or more of the TMAs.

By far, the most effective of Smart Commute's many strategies to divert trips from single occupancy motor vehicles has been the Carpool Zone, an on-line ride-matching service (Lanyon 2007). Strategies to divert trips into more active modes, like walking or bicycling have not been as successful. Perhaps most promising in this regard are guaranteed ride home programs, which guarantee persons who choose to walk, bike or take transit, a ride home in extraordinary circumstances. It is easier for a person to choose to ride a bike to work when they know that, in the case of rain or snow or medical emergency, they won't be stranded at work. Minneapolis has a program which offers cyclists USD\$50 worth of vouchers each year for bus or taxis, for those instances when they are unable to ride home from work.

A number of GTHA municipalities reported pursuing their own activities in TDM, operating employee trip reduction programs specifically for municipal staff:

- The Town of Markham's Town Employee Commuter Options program has an annual budget of \$40,000 and attempts to influence commuter choice via transit discounts, a guaranteed ride home program, ride-matching, a Bicycle User Group, and a telework pilot program.
- The Region of York's TDM program includes transit fare media provided at a 50 percent discount, and reserved carpool parking spots at prime locations.
- The City of Burlington has had flexible working hours for many years as well as a telecommuting policy, and has recently installed bike lockers at City Hall, and started an emergency ride home program.
- The Town of Ajax's initial foray into TDM was the recent dedication of preferred parking spots in the municipal parking lot for employees who carpool to work.
- The Municipality of Clarington has facilitated the expansion of GO Transit by purchasing lands for the Bowmanville GO Terminal and park/ride facilities.
- The City of Hamilton is developing a proposal for an employee trip reduction program for City employees.

By increasing the usage-related costs of driving, road pricing—i.e. road tolls, parking pricing, and congestion charges—also serve as TDM measures. Road pricing is particularly effective at managing demand when the prices increase per unit of time or distance during periods of peak demand versus times of lower demand. While all GTHA municipalities charge for parking, in some cases at rates that vary with time of day, none levy road tolls or congestion charges. The 407 Electronic Toll Road, a privately-operated controlled access highway, is the only toll road in the GTHA. Congestion charges—i.e.

fees to enter a specified zone during certain hours—are not currently levied in the GTHA, however high-profile examples of this strategy are in operation in the cities of London (England) and Stockholm (Sweden), among others.

11.0 ACCESSIBILITY

The 2005 *Accessibility for Ontarians with Disabilities Act* mandates that all Ontario municipalities with a population greater than 10,000 must have an Accessibility Advisory Committee, on which the majority of members must be disabled. All municipalities in the GTHA have crossed that population threshold and should have committees in place.

The Act further stipulates that a municipal council must seek input from its Accessibility Advisory Committee on site plans and drawings for *buildings* that the council purchases, constructs, renovates, or enters into a new lease for. The Act does not specify a role for the Committees in the design of transportation infrastructure or development of transportation policies or programming. Notwithstanding this, two GTHA municipalities—Durham and Hamilton—reported involving their Committees in decision-making around mobility, including the design or re-design of signalized intersections.

Two GTHA municipalities—Ajax and Oshawa— reported employing staff whose focus is exclusively accessibility issues.

Most GTHA municipalities responding to the questionnaire reported that they have installed accessible infrastructure, in particular, curb ramps and Accessible Pedestrian Signals (APS), at intersections. Their responses are reviewed below, as is the status of transit vehicle accessibility.

11.1 CURB RAMPS

By eliminating sudden changes in elevation between sidewalk and road, curb ramps improve accessibility for everyone, but particularly for people who use wheelchairs. All GTHA municipalities responding to the survey reported that they have installed curb ramps at some intersections where there are sidewalks. Six (Caledon, Durham, East Gwillimbury, Halton Hills, Uxbridge and York) reported that they have installed curb ramps at *all* intersections where there are sidewalks. Hamilton reported that curb ramps are standard at all new and reconstructed intersections. Burlington reported that it has an annual program for sidewalk improvements to better accommodate the needs of the physically challenged. A few municipalities (Clarington, Hamilton, Oshawa) reported that their infrastructure also includes tactile cues such as textured crosswalks, or directional grooves in

curb ramps, to enhance traction and guide persons with visual impairments.

11.2 ACCESSIBLE PEDESTRIAN SIGNALS

Accessible Pedestrian Signals (also sometimes referred to as Audible Pedestrian Signals) are devices that communicate information about pedestrian phase intervals using non-visual methods such as audible tones, verbal speech messages, or vibrating surfaces. Most but not all municipalities responsible for the provision of traffic signals in the GTHA reported having installed APS in a limited number of locations. Among GTHA municipalities, only Durham reported having a policy on the installation of APS, although Hamilton reported that it plans to finalize a policy in the next three months. Under Durham's policy, requests for APS are only accepted from organizations representing the blind, and not from individuals. Requested locations are assessed against a lengthy set of criteria before a decision is made.

Several other Canadian municipalities have policies regarding the deployment of APS. In Burnaby, Coquitlam, Delta, and Saanich (all in BC), for example, and in Ottawa, all new signal installations are to include APS. In Burnaby and Ottawa, all signal upgrades are to incorporate APS, as well (City of Surrey 2005).

11.3 TRANSIT VEHICLE ACCESSIBILITY

Often, persons who are able to walk or wheel to a bus stop are unable to mount the steps of a high-floor bus or streetcar thereafter. Some of these people book rides with specialized transit providers, while others will get to where they need to go in private motor vehicles. More of them would choose to walk to a bus stop and travel by conventional—i.e. scheduled, fixed-route—transit if they knew that when the bus arrives it will have a low floor and/or wheelchair ramp. However, as Table 8 illustrates, nearly half of the conventional transit vehicles in GTHA are not accessible.

Table 8 also indicates that, in this regard, the GTHA does not lag behind all other leading urban areas. Whereas fully 81.1 percent of the conventional transit fleet in the Vancouver area is accessible, and 59.6 percent in Ottawa-Gatineau, both Calgary (at 53.8 percent) and Montréal (48.4 percent) lag behind the GTHA, where 57.8 percent of transit vehicles are accessible.

Brampton Transit	66.1 percent
Burlington Transit	37.2 percent
Durham Region Transit	46.0 percent
GO Transit	43.0 percent
Hamilton Street Railway	74.5 percent
Milton Transit	0.0 percent
Mississauga Transit	74.1 percent
Oakville Transit	67.5 percent
Toronto Transit Commission	55.3 percent
York Region Transit	80.5 percent
Total - GTHA	57.8 percent
Calgary Transit	53.8 percent
TransLink (Vancouver)	81.8 percent
OC Transpo	65.6 percent
ST Outaouais (i.e. Gatineau)	35.8 percent
Total - Ottawa-Gatineau	59.6 percent
Laval	59.6 percent
Longueuil	71.1 percent
Montréal	43.8 percent
Total - Montréal	48.4 percent

Source: Canadian Urban Transit Association.

TABLE 8. PERCENT OF TRANSIT FLEET THAT IS ACCESSIBLE IN SELECTED CITIES

12.0 TRANSIT INTEGRATION

GTHA municipalities with conventional transit service were asked questions about the integration of their service with walking and bicycling. All nine municipalities with conventional transit service responded to this section of the survey.

12.1 BIKE RACKS ON BUSES

As is illustrated in Table 9, very few transit buses in GTHA have external bike racks except in Burlington and Hamilton, where virtually all buses are thus equipped. The installation of external bike racks on buses is much more widespread in other North American urban areas, as is demonstrated in Table 10. Particularly in low-density areas where the walk to a bus stop may be long and the wait between buses longer, the ability to combine bicycling with transit would make both options more attractive.

Brampton Transit	0 percent
Burlington Transit	99 percent
Durham Regional Transit	0 percent
Hamilton Street Railway	100 percent
Milton Transit	0 percent
Mississauga Transit	0 percent
Oakville Transit	15 percent
Toronto Transit Commission ^v	7 percent
York Regional Transit	0 percent

TABLE 9. PERCENT OF BUSES IN GTHA WITH BIKE RACKS

TABLE 10. PERCENT OF BUSES IN SELECTED URBAN AREAS WITH BIKE RACKS

Boulder, CO	99 percent
Minneapolis	100 percent
Montreal (STM only)	0 percent
Ottawa (OC Transpo only)	31 percent
Portland, OR	100 percent
San Francisco	100 percent
Seattle	100 percent



BUSES WITH BIKE RACKS EXTEND THE REACH OF TRANSIT AS WELL AS CYCLING.

While there are doubtless other reasons for the limited number of buses in GTHA with external bike racks, both the *Highway Traffic Act* and the *Public Vehicles Act* pose challenges to transit systems wishing to pursue this strategy. Section 109 (11) of the *Highway Traffic Act* stipulates that “No bus, other than an articulated bus, shall exceed the length of 12.5 metres while on a highway.” With an external bus rack fully deployed, however, most standard transit buses exceed 12.5 m in length. Transit systems wishing to operate buses with external bike racks must apply annually to the Ministry of Transportation for a special vehicle configuration permit. The application fee is \$1,000, and the permit is transferable, which is to say that one is sufficient for an entire fleet, *but* it must be photocopied and kept in each vehicle. A complicating factor is that for transit systems whose buses cross municipal boundaries, such as Durham Regional Transit (DRT), GO Transit (GO), or York Regional Transit (YRT), the application must be accompanied by a letter of support from every municipality in which the system intends to operate, and, although a separate fee is not required for each municipality, a separate permit is issued to the transit system for each (Barsalou 2007).

Survey respondents suggested that the *Public Vehicles Act* also poses a challenge to the installation of external bike racks on buses, but did not specify how. The Act, which is intended to regulate the operation of commercial, inter-city passenger carriers, such as Greyhound, also applies to regional transit systems, like the DRT, GO and YRT, by virtue of the fact that their buses cross municipal boundaries. Sections 23 and 24 of the Act, which are reproduced below, *could* be interpreted as disallowing external bike racks on regional transit vehicles:

Trailers prohibited

23. Except when specially authorized by the Minister, no person shall operate a public vehicle with any trailer or other vehicle attached thereto, but where a vehicle becomes disabled on a trip and is unable to proceed on its own power, the vehicle may be towed to the nearest point where repair facilities are available.

Luggage

24. A public vehicle shall not carry or transport any luggage, baggage, package, trunk, crate or other load that extends beyond the body limits of the vehicle.

Section 23 could be interpreted in a way that would prohibit bicycles, as *vehicles*, from being attached to a bus. Similarly, Section 24 could be interpreted in a way that would prohibit bicycles, as *luggage*, from being attached to a bus.

12.2 BIKES INSIDE TRANSIT VEHICLES

Given the paucity of external bike racks on transit buses in GTHA, transit system policies regarding the carrying of bicycles *inside* buses could be a tool to increase the integration of the two modes. However, the existing policies are not very accommodating of bicycles. Most permissive are the policies of DRT, the Toronto Transit Commission (TTC) and YRT, which permit bicycles on buses during off-peak hours, except when the vehicles are heavily loaded, in the operator's opinion, or there is an emergency. The situation is similar in Burlington, Hamilton and Mississauga, except that there is no suggestion that bikes might, as a matter of course, be accommodated during off-peak hours: i.e. it is left entirely to the operator's discretion.^{vi} In Oakville, the situation is unclear. While the survey respondent reported a policy similar to that of DRT, the TTC and YRT, the transit system's website states that bicycles are prohibited at all times. Bikes are prohibited from Milton Transit and GO buses at all times, although GO does allow folding bicycles to be put in the under-floor luggage compartments of the buses that have them, but even then only if they are in their proper carrying cases. Brampton Transit reported that it has no policy regarding bicycles on its buses.

The policies regarding bringing bikes inside buses are not necessarily more permissive in other, comparable urban areas. Bicycles are prohibited altogether from the buses of Société de Transport de Montréal (STM) and Calgary Transit, for example. In Ottawa, bicycles are not prohibited on the bus, but are only be allowed when there is a less than a seated load, and only at the operator's discretion. In Boulder, Minneapolis, Portland, San Francisco and Vancouver, where virtually all buses are equipped with external bike racks, this is less of an issue. It is worth noting, however, that bicycles are welcome inside the buses in Portland at all hours, bike racks notwithstanding. Ultimately, a firm policy is preferable, even if it is somewhat restrictive, to leaving the decision to the driver. Where would-be customers cannot rely on being able to bring their bicycles on board the bus, they will find another way to travel, which may not include either mode.

Figure 1, below, illustrates the hours during which bicycles have access to rail transit vehicles, including subways and light rapid transit vehicles in selected North American cities. Both transit systems in GTHA with rail vehicles, GO and the TTC, allow bikes during off-peak periods, as do the transit systems in Calgary and Montréal. In Ottawa

FIGURE 1. HOURS OF BICYCLE ACCESS TO RAIL VEHICLES, BY TRANSIT SYSTEM

and Portland, however, bicycles are allowed at all times, albeit with conditions attached.

	6:00	7:00	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	WEEKENDS	HOLIDAYS
CALGARY	■			■	■	■	■	■	■							
MONTREAL				■	■	■	■	■	■					■		
OTTAWA	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
PORTLAND	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
TORONTO	■			■	■	■	■	■	■					■		

12.3 WALKING DISTANCE TO TRANSIT

Studies have shown that most people will not walk more than 400 m—five minutes—to a bus stop. The service standards of many Canadian transit systems reflect this. A 2001 survey of Canadian transit systems found that the two most common standards, each upheld by seven transit systems, were “95 percent of the population within 400 to 500 m” and “90 percent of the population within 400 and 450 m” of a bus stop (CUTA 2001).

To gauge how well this standard is being met in GTHA, municipalities with transit service were asked what percentage of their population lives within 400 m of a bus stop. Responses ranged from highs of 95 percent in both Hamilton and Oakville to a low of 73 percent in Mississauga. The full range of responses are included in Table 11, below.

TABLE 11. PERCENT OF POPULATION WITHIN 400 M OF TRANSIT STOP

Hamilton	95 percent
Oakville	95 percent
Toronto	94 percent
Brampton	85 percent
Burlington	85 percent
Durham	80 percent
York	77 percent
Milton	75-80 percent
Mississauga	73 percent

There may be many reasons why some GTHA municipalities do not meet the highest standards in this regard. Transit service in Durham and York, for example, is provided by regional governments with jurisdiction over large land areas, including wide swaths of rural areas where conventional transit service cannot be provided economically. In other jurisdictions, the problem may be related to urban form: i.e. street networks in suburban areas are often curvilinear and discontinuous, and short, direct walks to bus stops are the exception to the rule.

In suburban areas with discontinuous street networks and in some rural areas, bicycle infrastructure—bike paths and bike racks on buses or at bus stops—may be an appropriate way to improve mode integration. In the most remote, lowest-density rural areas, however,

alternative methods of transit service delivery may be a more appropriate response.

Regardless, it is important to bear in mind that the proximity of a bus stop is not in and of itself a good indicator of the attractiveness of transit service. The headway between buses is equally important. People are unlikely to walk to a bus stop if the buses come infrequently, even if the stop is less than 400 m away. While an analysis of headway together with walking distance to service is beyond the scope of this project, it should be part of future analyses of transit integration in GTHA.

In the interim, headways could be improved in GTHA transit corridors that are shared by more than one service provider, if the parties were to negotiate revenue-sharing agreements allowing each other to take on passengers at all stops.

13.0 BARRIERS TO SUPPORTING ACTIVE TRANSPORTATION

GTHA municipalities were asked what barriers prevented them from doing more than they already are to support active transportation. There were very clear patterns in the responses.

Twelve (12) of seventeen (17) GTHA municipalities responded that limited financial resources was an issue. In light of the near absence of active transportation partnerships with provincial and regional agencies, as discussed above, this is not surprising. Of course, there are municipalities that *choose* to invest in active transportation notwithstanding the absence of funding partners at the provincial and/or regional level—Caledon and Calgary, for example. To a degree, then, when staff at GTHA municipalities say that they have limited financial resources for active transportation, what they mean is that active transportation has a low profile in their communities and no effective champion, so there has been no need to give it priority. Indeed, two GTHA municipalities said just that: limited interest in active transportation among municipal staff, Councillors, and the general public, and the lack of a champion for the issue, is a barrier to doing more to support it.

Four (4) GTHA municipalities reported that a lack of staff is a barrier to their doing more to support active transportation. Again, as discussed in Section 2.2, there is insufficient data with which to compare the number of FTEs devoted to walking and cycling at GTHA municipalities versus other urban areas. However, given the ratio in U.S. municipalities of one active transportation FTE for every 357,000 residents, and considering that 22 of 30 GTHA municipalities have populations well below that threshold, the region may well not have

enough trained professionals to handle the work that needs to be done.

Three (3) municipalities, all of them upper-tier municipalities, reported that the division of responsibilities between upper- and lower-tier municipalities was a particular challenge. When the priorities of the municipal Councils in a Region are not aligned, the result can be a truncated, discontinuous network of facilities of varying quality. Continuity, however, is key to any effective transportation network.

Three (3) municipalities reported that deficiencies in the existing transit service are a barrier to doing more to support active transportation. For one municipality, the issue is simply that the quality of the service is too low to divert people from driving their cars instead. The other two cited the lack of integration between the modes—walking, bicycling and transit—as a hurdle, one of them specifically pointing to the *Public Vehicles Act* as a barrier to improved integration. The Act, whose dampening impact on the deployment of bike racks in GTHA was discussed in Section 12.1, is problematic in at least one other way: it prohibits regional passenger carriers from carrying more than a full seated load plus 1/3 standees, even though having more standees on municipal buses is an everyday reality, can be done safely, and is preferred from an efficiency perspective.

Three (3) municipalities reported that the low-density, mostly-rural nature of their jurisdictions works against active transportation. They seem to argue that the distances between land uses in their jurisdictions are too great to be traversed by foot or on a bike, even if active transportation infrastructure were in place. In reality, each of these municipalities has at least one built up area with the characteristics of a small town, where the provision of active transportation facilities, sidewalks and bike racks, for example, would make it more attractive for residents to do some of the activities on foot or by bike.

A handful of other barriers were reported by one municipality each, chief among them:

- the disconnect between land-use and transportation planning; and
- the lack of support from the province, particularly in legislation.

GTHA municipalities also alluded to physical barriers to supporting walking and biking: controlled access highways; railway and hydro corridors; and subdivisions with winding, curvilinear streets, but no pedestrian or bicycle short-cuts. All of these physical features act as barriers to walking and bicycling by reducing connections between streets, preventing direct routing and thereby increasing trip length.

14.0 CONCLUSIONS AND RECOMMENDATIONS

Excessive reliance on motor vehicles is having negative impacts on the health of GTHA's people, economy and environment. Region-wide, air pollution, much of it associated with transportation activities, causes 2,800 premature deaths and thousands more hospital admissions and emergency room visits each year. While the value of the lives lost and illness suffered is incalculable, the economic costs of these deaths and illnesses—costs to the health care system, for example, and losses in productivity—are estimated at \$439.2 million per year (Ontario Medical Association 2005). Deaths and illnesses arising from physical inactivity and obesity, side effects of automobile dependency, also exact human and economic costs.

At \$10,602 per year, GTHA households spend more on transportation than their counterparts in the urban regions of Ottawa-Gatineau (\$10,198), Vancouver (\$9,451) and Montréal (\$7,556) (Financial Post 2007).^{vii} Furthermore, it is estimated that the economic costs of traffic congestion in the Toronto and Hamilton CMAs combined are between \$896.2 million and \$1.6 billion per year. While on a per capita basis GTHA's congestion costs are comparable with those of the Montréal and Vancouver areas, they are much higher than in Calgary and Ottawa-Gatineau (Transport Canada 2006).

All of the aforementioned costs would be reduced if more people in GTHA had the option of using walking and bicycling as transportation options more often.

To protect the quality of life of GTHA residents and to ensure its continued competitiveness compared to other leading urban regions, it is essential that trips in the region be shifted away from less sustainable modes of transportation, such as single-occupancy motor vehicles, and toward more sustainable modes, like walking, bicycling and transit.

To that end, it is recommended that the following steps be taken to assist GTHA municipalities in supporting active transportation:

1. Following on the investment announcements already made by Metrolinx (2007) regarding the purchase of safe/secure bike storage and bike racks for buses, support should be sought for continued investment in the integration of active transportation with transit; and
2. An active transportation research program should be established to examine in greater depth the key issues identified thus far, as well as any relevant issues identified in the future. Particular consideration should be given to prioritizing the following actions:
 - a. A review of provincial legislation, policies and programs that may be discouraging active transportation, and, if appropriate,

- the development of proposals to amend that legislation and change those policies and programs that are problematic;
- b. Examining opportunities for the removal of other disincentives to active transportation and the adoption of effective incentives;
 - c. Developing a detailed plan for an active transportation cost-sharing program between Metrolinx, GTHA municipalities, the province and other partners; and
 - d. Developing model land use, development and transportation planning policies.

More about each of these recommendations is included below.

14.1 AN ACTIVE TRANSPORTATION CAPITAL PROGRAM

First, it is recommended that support be sought for an active transportation investment strategy to incrementally improve walking and bicycling infrastructure in areas where it has direct authority. The announcement by Metrolinx of plans to invest between \$2.1 million and \$3.2 million for secure bike storage at GO stations, and another \$1.0 million to \$1.8 million for external bike racks for buses, is a big step in the right direction, as is the stated goal of having external bike racks on 100 percent of buses across the province. The next step should be to inventory the active transportation infrastructure already under Metrolinx jurisdiction, identify the opportunities for investment that are most likely to result in an increased mode share for active transportation, and seek support from the province for moving forward.

14.2 AN ACTIVE TRANSPORTATION RESEARCH PROGRAM

It is recommended that an active transportation research program be established to examine in greater depth, and in collaboration with GTHA municipalities and other stakeholders, the key issues raised in this overview. The earliest priorities of this research program, more about each of which is included below, might include:

- A review provincial legislation, policies and programs that may be discouraging active transportation, and, if appropriate, the development of proposed amendments to that legislation and changes to policies and programs;
- An examination of other disincentives to active transportation and the development of strategic incentive programs for individuals and businesses to use active transportation;
- The development of a detailed plan for an active transportation cost-sharing program between Metrolinx, GTHA municipalities, the province and other partners; and
- The development land use and transportation planning policies that will facilitate active transportation.

In the longer term, a review of municipal policies and upper-tier vs. lower-tier responsibilities would also be appropriate, and other areas

for attention would be identified, by Metrolinx, GTHA municipalities, the province and others.

By creating and operating an active transportation research program, the knowledge and skills necessary to develop effective active transportation policies and plans will be acquired. Particularly for the many municipalities in GTHA that are too small to employ their own trained full-time pedestrian and bicycle professionals, this base of knowledge and skills would be an important resource to draw on.

14.2.1 A Review of Relevant Legislation

A review of provincial legislation, policies and programs that may be having the unintended effect of discouraging active transportation is recommended, and, where appropriate, the development of amendments to the legislation and changes to the policies and programs. In particular, it is recommended that both the *Public Vehicles Act* and the *Highway Traffic Act* be reviewed for content that may inhibit the installation of bicycle racks on the outsides of transit buses. Better integration of transit with bicycling will increase the likelihood of these modes of transportation being chosen over private automobiles, particularly in areas where the distance to the nearest bus stop is long.

The *Public Vehicles Act* and current “closed door” policies should also be reviewed for content that may be having the unintended effect of reducing the reliability and convenience of transit service on routes that cross municipal boundaries. If legislation is forcing buses to pass by stops with their doors closed, leaving potential passengers waiting, this makes transit an unreliable and unattractive transportation option. Being assured that passing buses would actually stop would increase the likelihood of people walking to a stop to catch a bus rather than driving to their destination.

Finally, in keeping with the recommendations of the Regional Coroner for Toronto in *A Report On Cycling Fatalities In Toronto, 1986 – 1998*, the *Highway Traffic Act* (1998) should be reviewed for content that is unclear or inconsistent with respect to bicycling and bicyclists, and therefore hard to promote and enforce. In particular, sections about lane positioning, safe passing distances, and visibility requirements should be considered. If the rules governing interactions between road users are clarified, the experience of riding a bicycle will become more predictable, and thus more attractive.

14.2.2 An Active Transportation Cost-Sharing Program

It is recommended that a detailed plan be developed for a cost-sharing program to assist GTHA municipalities in installing active transportation infrastructure and operating active transportation programs. This process would involve answering questions such as which the partner agencies should be, what types of projects would be eligible for funding, and how investment decisions would be made.

The need for a cost-sharing program is clear. In most other large urban regions in Canada, there are important provincial and/or regional partners that share the costs associated with supporting active transportation, and the mode shares of walking and bicycling are higher, likely as a result of the investments made. What is more, the overwhelming majority of GTHA municipalities report that limited financial resources are preventing them from doing more than they already are to support active transportation. Even though active transportation simply may not be perceived as a priority for investment in these communities, a program under which the costs of such investments would be shared would help reshape those priorities and leverage municipal investment.

A cost-sharing program would offer the additional benefit of helping to standardize the types of infrastructure installed. The details would need to be further determined, but establishing strict criteria about the types of projects eligible for support would likely result in fewer non-standard or sub-standard treatments.

14.2.3 Model Land Use and Transportation Planning Policies

It is recommended that model land use and transportation planning policies be developed for implementation in areas where Metrolinx has direct authority, and that GTHA municipalities be encouraged to adopt similar policies in their areas of jurisdiction, as well.

14.2.3.1 A Complete Streets Policy

When implemented, a complete streets policy would result in the routine accommodation of pedestrians and cyclists whenever a new Metrolinx road is built or an existing one reconstructed. In the short term, this would ensure that access to every rapid transit station was safe and inviting for people arriving on foot or by bicycle, through the installation of sidewalks, bike lanes and human-friendly intersection treatments. In the longer term, if this or similar policies are adopted by GTHA municipalities, it could result in a network of facilities similar to the National Capital Commission's trails system in Ottawa-Gatineau, or the *Ministère des Transports au Québec's* province-wide *la Route Verte*: i.e. major transportation corridors for people who choose to commute on foot or by bike.

14.2.3.2 A Transit-Oriented Development Policy

When implemented, a Transit-Oriented Development (TOD) policy would result in mixed-use developments at higher densities, where large numbers of people would be able to access the places they need to access on a day-to-day basis without ever getting into a private automobile. In the short term, it is recommended that development of this sort be pursued jointly with the owners of the land on which GO Transit stations and parking facilities are sited. Land in the immediate vicinity of higher-order transit facilities, like rail stations, has a high economic value because it can be accessed so easily by rapid transit. The highest and best use for this real estate is higher-density, mixed-used development, with car parking that is

underground or in multi-storey garages. In the longer term, if TOD policies are adopted by GTHA municipalities and this pattern of development becomes commonplace, the major reason why more Ontarians do not walk to work or to run errands—distance and the segregation of land uses —will have been addressed (Energy Probe 1989).

Traffic congestion, economic inefficiency, air pollution, and illness threaten GTHA's quality of life and its ability to attract and retain investment and skilled, creative people. Active transportation is a cost-effective tool with which to address these threats. It is our hope that it is recognized as such and treated accordingly..

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ENDNOTES

ⁱ As used throughout this document, the term Greater Toronto and Hamilton, or GTHA, refers to the Census Metropolitan Areas (CMAs) of Toronto, Hamilton and Oshawa combined.

ⁱⁱ The estimates do not generally include staff time spent on land acquisition, construction or maintenance.

ⁱⁱⁱ After air pollution/car exhaust, litter/garbage, and dangerous street crossings, and tied with traffic noise. Source: Energy Probe, *Why Ontarians Walk, Why Ontarians Don't Walk More*, 1989.

^{iv} The GTHA municipalities currently partnering in the program are Brampton, Burlington, Caledon, Durham, Halton, Hamilton, Markham, Milton, Mississauga, Newmarket, Peel, Richmond Hill, Toronto, Vaughan and York.

^v Does not include streetcars or subways.

^{vi} This is less of an issue in Burlington and Hamilton, where most buses are equipped with external bike racks, than in Mississauga, where none of them are.

^{vii} The comparable figure for Calgary is higher at \$11,831.