

Identifying and Overcoming Barriers to the Implementation of Active Transportation Policies

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Paper prepared for presentation
at the Geometric Design – Present Challenges Session

of the 2014 Conference of the
Transportation Association of Canada
Montreal, Quebec

This project was made possible through funding
from Metrolinx, an agency of the Government of Ontario

¹ Nancy Smith Lea will be presenting this paper at the conference.

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Abstract

This research paper investigates the implementation of Ontario's provincial and municipal policies that seek to build communities that encourage walking and cycling. Although policies have recently come a long way in recognizing and promoting active transportation, aligning policy is different than aligning practice, and current policies are not necessarily translating into successful on-the-ground implementation. This paper explores the institutional barriers that exist in detailed planning, development, engineering, and construction process that have not caught up with higher-level policies including engineering standards and other institutionalized practices.

Research objectives included charting real-world decision-making processes that move "policy" to "implementation" when it comes to infrastructure that prioritizes active transportation, identifying policy gaps and/or the need for new or updated tools (such as professional guidelines/standards, education/training, regulatory updates, etc.) to facilitate the achievement of active transportation policies.

In order to better understand how provincial policies are or are not translating into current practices, between 2013 and 2014 the research team: (1) conducted a review of provincial policy, municipal policy, and professional street design guidelines such as those produced by the Transportation Association of Canada (TAC); (2) conducted two focus group sessions with planning and engineering professionals; (3) and carried out several case studies of Toronto area road projects that either incorporated, or failed to incorporate, active transportation facilities. The research was also carried out with the assistance of an advisory group of professionals involved in AT planning and design that reviewed project reports and provided critical feedback and insight into the policies and processes involved in providing active transportation facilities.

Overall, the research found that despite high level policies that encourage active transportation, institutionalized barriers continue to exist that promote roadway design primarily oriented toward accommodating motor vehicles. In some cases, such as the Municipal Class Environment Assessment, there is not consensus on how the process does and does not create barriers to active transportation, nor how the process *should* work. The promotion of motor vehicle roadway design in other cases, such as the standardized and often mandated performance measures such as Level of Service and Traffic Impact Studies, was much clearer. Complex interactions between different levels of government, the ways that the capital budgeting process works, and other aspects of how roadways are financed, designed, and produced all interact to produce environments that continue to prioritize the accommodation of motor vehicles, sometimes despite policy.

1. Introduction

Despite a burgeoning literature on environments that support active transportation (AT) (e.g. Pucher et al., 2008, Frank et al., 2010), and adoption of Complete Streets policies in more than 600 jurisdictions across the United States (Seskin & Murphy, 2014), there is limited research on the practical barriers to the implementation of new street designs "on the ground." Exceptions include Southworth and Ben-Joseph (1995), focusing on design guidelines, Hess (2009), focusing on the role of road classification systems, and Henderson (2011), examining measures of Levels of Service (LOS), all of whom find institutionalized practices are oriented toward designs that accommodate motor vehicle traffic, often to the exclusion of other modes. This paper adds to this limited literature by examining these types of barriers to making better facilities that support AT as part of the design, construction, and reconstruction of roadways in the Greater Toronto and Hamilton Area (GTHA).

Recent policies of the Province of Ontario, found in the documents such as the Provincial Policy Statement and the Growth Plan for the Greater Golden Horseshoe, along with municipal policies such as found in Official Plans and Transportation Master Plans seek to build communities that encourage walking and cycling. Indeed, over the past decade, GTHA municipalities are now increasingly adopting

policy language that is intended to support active transportation and Complete Streets (Whitney, 2012). In order to better understand how these policies are or are not translating into current practices, the authors: (1) conducted a review of provincial policy, municipal policy, and professional street design guidelines such as those produced by the Transportation Association of Canada (TAC); (2) conducted two focus group sessions with planning and engineering professionals³; (3) and carried out several case studies of Toronto area road projects that either incorporated, or failed to incorporate, active transportation facilities. The research was also carried out with the assistance of an advisory group of professionals involved in AT planning and design that reviewed project reports and provided critical feedback and insight into the policies and processes involved in providing AT facilities.

We begin the paper by discussing the Ontario transportation policy context as it relates to active transportation in the GTHA. This policy framework is generally supportive and is evolving to give even further emphasis to the role of AT, but has not yet widely adopted “Complete Streets” language. We then turn to: the significance of the Municipal Class Environmental Assessment (MCEA) process in relation to AT facilities; the general road project design process in determining the scope and features of roadway projects; the use of LOS and Traffic (or Transportation) Impact Studies (TIS) as important roadway performance measures that impact design; and the general role of professional roadway design guidelines and standards. We present general findings rather than examining the case studies and focus in detail. Given the limited scope of the research, the findings are not generalizable to all jurisdictions in the GTHA, nor are they definitive. Indeed, the use of policies, guidelines, and processes such as the MCEA are complex and cannot be fully understood outside of the day-to-day negotiations that take place in project decision-making and implementation. We also purposefully did not focus on either the role of fiscal constraints or the role of politics. Both are clearly important, and were always present in our discussions at focus groups and in the case studies, so we do briefly touch on them in the paper. Still, with these caveats, our findings are in accord with what is found in the existing research literature. Specifically, we find that institutionalized processes, like the MCEA Process, performance measures, such as the use of LOS and TIS, and design guidelines, among other issues, are continuing to encourage the production of streets that are primarily designed for motor vehicle movement despite provincial and municipal policies that support the development of facilities for AT.

2. Transportation Policy Context

2.1 Provincial policy. Ontario’s *Provincial Policy Statement* (2005, revised in 2014), *Growth Plan for the Greater Golden Horseshoe* (2013), and *Regional Transportation Plan, The Big Move* (2008), developed by Metrolinx, provide a broad planning policy framework in the GTHA that explicitly includes active transportation.⁴

The *Provincial Policy Statement* (PPS) is an overarching, although fairly general policy document that links the provincial Planning Act to Official Plans developed by municipalities. The 2014 revision of the PPS, for the first time, uses the term “active transportation,” replacing “alternative transportation modes” in previous versions. Other notable changes include:

- Increasing the “use of active transportation and transit before other modes of travel” is prioritized (Part IV);
- Land use patterns within settlement areas shall be based on densities and a mix of land uses which ... support active transportation (1.1.3.2); and

³ Focus groups were carried out in York Region, with professionals working at the regional and municipal level, as well as consultants involved in street design, and in the City of Burlington, with professionals working for the City and for the Region of Halton.

⁴ The *Accessibility for Ontarians with Disabilities Act, 2005*, may also influence street design through its requirements for sidewalks and road crossings that accommodate people with disabilities, but is not considered here.

- Streets should “foster social interaction and facilitate active transportation and community connectivity” (1.5.1).

Of the above, perhaps the most significant change is the use of “shall” regarding the inclusion of active transportation in land use planning (1.1.3.2), language that is directive, rather than merely enabling or supportive (Ontario Ministry of Municipal Affairs and Housing, 2014: 2). However, in the transportation section of the PPS, active transportation is still only referred to as a mode that “should be promoted” rather than using more directive language. Notably, there is no reference to the idea of Complete Streets in the revised PPS, despite recommendations by organizations such as the Toronto Centre for Active Transportation (TCAT) (Smith Lea, 2010, Koehl, 2012) and by the Office of the Chief Coroner for Ontario (Office of the Chief Coroner for Ontario, 2012a, 2012b) that such language be adopted.

In addition to the PPS, under the Places to Grow Act, 2005, all Official Plans for municipalities within the Greater Golden Horseshoe (GGH) are also required to conform to the policies of the *Growth Plan for the Greater Golden Horseshoe* (The Growth Plan). The Growth Plan aims to “create complete communities” and outlines a set of policies for managing growth and development and guiding planning decisions in the GGH until 2041. (Ontario Ministry of Infrastructure, 2006)

The Growth Plan contains broad policies with which municipal Official Plans must conform. The main thrust of the plan is allocating where growth should occur and setting intensification and density targets. The plan also contains broad policy statements about transportation, including ones that promote walking, and bicycling. The plan is most specific in section 3.2.3, “Moving People,” where it directs that “Municipalities will ensure that pedestrian and bicycle networks are integrated into transportation planning to: a) provide safe, comfortable travel for pedestrians and bicyclists within existing communities and new development [and to] b) provide linkages between intensification areas, adjacent neighbourhoods, and transit stations, including dedicated lane space for bicyclists on the major street network where feasible.” Having this broad direction to incorporate AT into land use and transportation planning is important, but the Growth Plan does not give further direction or benchmarks in how to do so or what constitutes the limiting clause “where feasible.” This is left to municipal policy documents.

A final Provincial Plan, The Big Move (2008) is the overarching transportation plan in the GTHA, developed by Metrolinx, a provincial Crown Agency created in 2006 to plan, finance, and implement a regional multi-modal transportation system in conformance with The Growth Plan. Thus, The Big Move sets the transportation planning framework for the region and is intended to guide more than 50 billion dollars in transportation investment over 25 years, with about one-third of the funds committed to date.

The importance of active transportation is highlighted throughout The Big Move, particularly in two of the overarching strategies. (Metrolinx, 2008) Strategy #2, “Enhance and Expand Active Transportation”, recognizes the opportunity to increase the number of biking and walking trips through street and network planning and design. Strategy #7, “Build Communities that are Pedestrian, Cycling and Transit-Supportive”, discusses the critical relationships and opportunities for integrated transportation and land use planning. Within both strategies, a “Supporting Policies” section uses directive language (e.g. “shall” and “should”) in relation to active transportation infrastructure and active transportation supportive development. Although it does not have statutory status, The Big Move could have an important impact on regional active transportation if used to prioritize the completion of gaps in cycling and walking networks. However, of the \$50 billion of planned capital investment, \$16 billion has already been allocated, primarily for transit expansion project, and there appears to be no concrete plans for active transportation in the remaining \$34 billion (Craig, 2013).

In general, the PPS, Growth Plan, and The Big Move are supportive of AT, although some policies are too new to be expected to already have impact of street design, and stronger support for AT is still needed

to better guide the development of municipal policy frameworks, including municipal Official Plans and Transportation Master Plans.

2.2 Municipal policies. On the municipal level, Official Plans (OP) and Transportation Master Plans (TMP) are important strategic documents required to consider active transportation under *The Growth Plan*. In two-tier municipalities, the OP of a lower-tier municipality must conform with the OP of an upper-tier municipality. We did not have the capacity to review the large number of lower-tier OPs in the GTHA, although there is considerable variation across the GTHA in their consideration of AT. In general, OPs set out overall policy for land use and development in a municipality. OPs also designate modal priorities, inform capital plans, and protect the development of future right of ways. OPs may have overall policy statements about the importance of active transportation, but AT is typically not a direct focus.

Unlike OPs, TMPs are not mandated by the Province, but most GTHA municipalities have TMPs to align transportation priorities with the high-level vision and goals outlined in the OP. The City of Toronto is a notable exception and does not have a TMP. The TMP forms the framework for transportation infrastructure and programs to be adopted for implementation as part of a long-term capital program. TMPs are subject to the MCEA approval process. Typically, municipalities will update their TMP in conjunction with the OP renewal, as mandated by the Province, every five years.

While we did not review TMPs for the lower-tier GTHA municipalities, we did review those of the Regions of Durham, Halton, Peel, and York (see Table 1). TCAT previously reviewed the OPs and/or TMPs of the 17 largest municipalities in Ontario including three GTHA municipalities: Hamilton, Oshawa and Toronto (Whitney, 2012). The TMPs adopted by most municipalities incorporate a vision for building a multi-modal transportation network that increases the modal share of transit, cycling and walking trips and decreases reliance on motor vehicles. Some municipalities also have Cycling, Walking or Active Transportation Master Plans that feed into the TMP. Complete Streets policies and guidelines are also beginning to be produced by some municipalities such as Toronto (currently under development) and Ajax, in Durham Region (Sears, 2014).

3. Municipal Class Environmental Assessment

The Ontario Ministry of the Environment describes the MCEA as “a self-assessment process for how municipalities and private sector developers plan municipal infrastructure projects” (Knowles, 2013). It is intended to identify, evaluate, and mitigate environmental impacts of designs, while also ensuring that infrastructure investments comply with the Places to Grow Act and Provincial Policy Statement (MEA, 2011, Sections A.2.10 and B.1.1). As mandated by the Ministry of the Environment, municipalities must follow this process in order to meet the requirements of the Environmental Assessment Act.

Under the Act, road infrastructure projects are classified according to the size of the project and the level of impact they will have on the existing environment – for roadway projects this is mostly defined in terms of whether a proposed project reduces roadway vehicle capacity. Projects with higher impacts are given higher “schedules,” and require a more involved public consultation and assessment process, which is costly in terms of both time and money. Some projects can be classified what is termed a Schedule A or A+, and be exempt from requiring a fuller Class EA planning process. Projects that do not alter the existing vehicle capacity of roadways are exempt, as are the construction of sidewalks and bike paths or lanes within existing right-of-ways. MCEA classification is subject to the proponent’s (typically the municipality’s) discretion, and documentation of the rationale for the classification is not required.

There was substantial disagreement on the role of the MCEA among experts participating in this research. Some argue that MCEA stands in the way of implementing AT projects by treating maintaining roadway capacity as the standard by which projects are scheduled. Because new facilities for active transportation can change the motor vehicle environment, they can involve a more rigorous process. In contrast, projects

that involve minimal change to the motor vehicle environment can be classified as a Schedule A or A+. Thus, the process rests on the assumption that the current transportation environment is in the desired state; neither the negative environmental impacts of maintaining motor vehicle capacity, nor the environmental benefits of increased active transportation are considered. Critics interpret this as creating incentives to avoid AT projects that might trigger a rigorous, expensive assessment. Exempting roadway projects without proposed AT facilities is also seen as preventing wider consideration of designs that would include their provision.

The discretion of the municipality in determining classification can be seen as contentious and limiting the scope of the project. Some municipal level participants, however, described the MCEA process as simply paralleling the kind of public and stakeholder input on projects that should take place in the normal planning process, and as both an opportunity to build public support for AT, or as a forum of opposition where AT facilities are removed from designs. Lack of public support for a project during MCEA consultations was identified as one of the significant barriers in some road projects. While public demand for active transportation has the potential to add it to a project's scope, the public is not universally supportive. For example, in the City of Burlington, a proposal to eliminate a centre-turn lane to enable new bike lanes on Lakeshore Road was met with community opposition, and sharrows were put in as a compromise. Participants suggested that the public is often mostly likely to support the "do nothing" option as part of MCEA consultations.

The MCEA process has, in fact, a long history of being widely criticized by a range of stakeholders, including Ontario's Environmental Commissioner (Environmental Commissioner of Ontario, 2009), academics (Lindgren & Dunn, 2010), the construction industry (Zechner, 2010), planners (Cumming 2011), and transportation engineers (Korell 1996). On February 19, 2014 Peel Region hosted an environmental workshop titled "Advantages and Disadvantages of Master Plans in the EA Process" that documented a range of problems with the EA process, such as 1) the disconnect with land use planning, 2) the process being too cumbersome, lengthy, expensive and time-consuming, and 3) creating duplication in public input that has already occurred through Planning Act processes, Places to Grow, municipal capital budgets, etc.

However, the Chair of the MCEA monitoring committee at the Municipal Engineers Association (MEA) considers the provision of AT on roadway projects as properly considered in OPs and other policy documents, and the MCEA to be a value neutral tool that is not intended to be used to enforce or promote policy or any specific infrastructure design (in conversation, Oct 29, 2013). On the other hand, some focus group participants in this research argued that ensuring that AT is considered during road reconstruction should be built in to the MCEA process. Others identified specific excerpts in MCEA that are not neutral. For example, under safety conditions, MCEA talks about road widening, but not about road narrowing or road diets, even though narrower roadways may be safer for non-motorized vehicle users (e.g. Thompson, 1996).

4. General Project Design Process

Road project planning and determining the scope and design features of a project is an iterative process whereby provincial, regional and municipal plans and processes, including public engagement, work in feedback loops (see, for example, Figure 1 York Region Road Design Process). Steps will vary from municipality to municipality, and from project to project, but the overall process follows similar logics. Scoping processes are usually initiated through a preliminary design report based on existing policies and plans. Whether AT will ultimately be included in a project and in what form is a complex multiple-stakeholder process involving land use planners, transportation planners, transportation engineers, lower-tier municipalities, the Council, and the general public. In general, it is impossible to summarize the complex interactions and negotiations of different actors in different settings and contexts that take place, and we do not further attempt to do so. However, based on our case studies and focus groups, we

comment below on issues that emerged around the coordination between different levels of government in defining a project, and the importance of funding and capital plans in defining the scope of projects.

4.1 Coordination between different levels of government. Issues around coordinating both the allocation of costs and design standards between different levels of government were evident in both the case studies and focus group discussions. This was found between Regions and lower-tier municipalities, but was especially contentious between the municipalities and the Ministry of Transportation of Ontario (MTO).

In general, several municipal practitioners and consultants felt the MTO made implementing newer roadway designs that better incorporate AT difficult. In particular, where provincial and local facilities intersect, MTO has jurisdiction and local roads have to adhere to MTO standards even when these differ from accepted municipal practice. An example from the case studies we conducted was Plains Road in Burlington, where negotiations took place between MTO and the City around putting in bike lanes by reducing travel lane widths below MTO standards on a bridge that crossed an MTO facility. The MTO allowed some reduction from 3.75 to 3.3 meters, but not as much as desired by the municipality (3.1 meters). MTO also required increased local costs for additional design features in order to allow the change. In both focus groups, some participants expressed a desire that MTO would give more consideration to existing local practices in roadway design. When presented with the Plains Road case study, some participants in the York session said they were surprised that MTO compromised at all.

Parallel to MTO/municipal relationships, in two-tier municipalities, the lower-tier municipality must conform to regional policies such as Official Plans. Likewise, lower and upper-tier municipalities can have different roles and approaches to providing AT facilities as part of roadway projects.

In York Region, participants commented that the division of responsibilities between upper and lower-tier municipalities for providing bike facilities was not always clearly defined. On regional roads, the region is responsible for what is in the roadbed, but not what is outside of the road yet still in the right of way. Thus, which tier has responsibility for financing, building, and maintaining a bike facility depends on whether it is located in the roadbed, and hence a regional responsibility, or along the roadway but outside of the roadbed and in the boulevard, and hence a local municipal responsibility. The region works closely with the local municipalities to plan and implement AT projects and negotiate which tier is responsible. Sidewalk facilities, located outside of the roadbed, are considered a local responsibility.

In Burlington, differences in the approaches between lower-tier Burlington and Halton Region were also discussed. As is typical elsewhere, both lower and upper tier municipalities create new bike facilities as part of roadway projects. For Halton, bike facilities are largely part of widening projects on regional roadways that increase traffic capacity. This can include buffered bike lanes or multi-use pathways. The regional government, however, does not consider walking facilities to be part of its mandate to facilitate regional travel, and, as in York, sidewalks are a local responsibility. Halton Region consults with local municipalities to ensure consistency in developing their AT Master Plan.

Although Halton Region's TMP envisages the regional roads to be widened to six lanes, Burlington does not support the additional widening of most arterials within its boundaries. These road widenings are a regional responsibility, but, with built-up conditions and developed properties along arterial right of ways, they require expensive expropriations that are considered neither desirable nor affordable. Instead, where possible, Burlington creates AT networks within the existing right of way without road widening by narrowing vehicle travel lanes to make space for bike lanes.

Burlington's experience conforms to many built-out municipalities within the GHTA, where there are few opportunities to widen roadways and accommodating both active and motorized transportation modes

requires reallocation of space in the existing right of way. While more challenging, this can actually create safer conditions for cyclists and pedestrians, with narrower streets that encourage slower speeds and decrease the distance that pedestrians need to cross streets. In contrast, while upper-tier municipalities like Durham and York are now building cycling facilities, they are largely doing so as part of creating very large roadways to move large volumes of traffic.

4.2 Funding and capital plans. Although financial costs and budgets were not a focus of this project, experts and practitioners raised these issues during both focus groups as affecting AT projects and their scope. In general, costs and insufficient funding for implementing AT were identified as a barrier in implementing municipal AT plans. This seems to be especially true for the lower tier municipalities where, because of their more urban context, projects can cost more on a per metre basis than regional projects.

Municipal priorities are set in Council-approved long term Capital Plans. Experts participating in the study agreed that because OPs and TMPs inform the capital planning process when municipal councils decide on their priorities, OPs and TMPs must contain strong language and support for AT to ensure that facilities are funded. The Context Sensitive Solutions policy recently developed in York Region was seen as part of such a strong policy context to guide investment. This is especially important because AT projects are typically bundled with larger road projects to minimize total costs, and, thus road projects are typically initiated when a road reaches the end of its life cycle or as a response to congestion/vehicle capacity. Therefore, AT facilities are primarily funded based on roadway construction priorities. If this funding is not built into the capital planning process, AT facilities will not be included in projects. Even in cities with strong commitments to AT infrastructure, some Councillors see money to pay for AT as extra costs, especially if there is not solid evidence for how specific facilities will increase AT use. Municipalities do not have the tools or resources to provide this evidence, which is very difficult or even impossible to establish. On the Provincial level, despite Ontario's new Cycling Strategy, there is not yet any funding provided to regions and municipalities for implementing cycling infrastructure.

5. Performance Measures: Level Of Service And Traffic Impact Studies

Street and roadway investments and how they are designed are powerfully influenced by the institutionalized use of performance measures by engineers and planners. These measures may be mandated by policy, or simply accepted practice. LOS and TIS, key performance measures for roadways, are reviewed below. LOS evaluates street function as a measure of vehicle volume to street capacity. TIS evaluate the impact of land development on local street facilities, mostly in terms of how development may affect LOS. Both are largely oriented towards evaluating the function of streets from the perspective of moving motor vehicles.

5.1 Level of Service (LOS). LOS captures street function as the relationship of vehicle volumes to capacity over a defined time span, with free flowing traffic being defined as a high LOS, and slow moving or stop-and-go traffic being defined as a low LOS. Municipal planning policies and planning guidelines currently require the evaluation of motor vehicle LOS, both to estimate the traffic impacts of new development through the TIS process, and also as a planning tool to target new roadway investment and guide street design decisions when LOS is seen to drop below a desirable level. Requirements do not exist for a similar level of evaluation for active transportation.

There is a clear disjunction between the ubiquitous use of motor vehicle LOS as a key evaluation and decision-making tool and current higher levels of policy that support active transportation as found in documents like the *Regional Growth Plan* and *The Big Move*. Corresponding tools for AT are much weaker and not as widely used. Further, improving motor vehicle LOS can have negative impacts on creating walkable and bikeable streets (Donnelly & Toop, 2011; Henderson, 2011). For example, a high motor vehicle LOS can be correlated with low-density land development, wide, multi-lane roadways, and

high-speed motor vehicle travel (Henderson, 2011), all factors that create poor walking and cycling environments. Additionally, the use of LOS as a standard planning tool promotes vehicle use by continually accommodating potential demand, rather than planning based on policies to shift modal shares to transit and AT, as emphasized in higher level policy. By continuing to prioritize motor vehicle LOS regardless of the context, active transportation designs cannot be simultaneously prioritized.

To understand the subsequent impact on road design, it is important to examine the specific ways motor vehicle LOS is applied for planning purposes. Currently, the estimation of LOS is highly standardized with *Synchro* software widely used across the GTHA by consultants and municipalities to model street designs under current and future traffic conditions. *Synchro* is a traffic analysis tool produced by the U.S. transportation software developer Trafficware. Designed for traffic engineers to determine intersection capacity, *Synchro* “supports the Highway Capacity Manual’s (HCM) methodology for signalized intersections.” (Planning & Analysis Software, n.d.). This has specific design implications. For example, the 2010 HCM suggests that using an analysis time of more than one hour may neglect critical peaks in traffic conditions, but this approach can lead to the provision of motor vehicle lanes that may only be required during a short period of peak demand.

If a longer peak period were used to analyze LOS with short periods of low LOS being acceptable, the resultant traffic model would require fewer travel lanes. Participants in this research also suggested that allowing lower vehicle LOS is becoming increasingly necessary because it is not possible to keep expanding roadways.

Measures of pedestrian and bicycle LOS do exist, including in the HCM, but there is no determined way to trade off LOS for different modes, as they are not equivalent. Vehicle LOS is a measure of volume to capacity, while for pedestrians, LOS may include sidewalk width, connectivity, and other factors. Also, we did not find evidence that jurisdictions in the GTHA are evaluating bicycle or pedestrian LOS. Even for knowledgeable practitioners, it remains challenging to evaluate trade-offs between different modes (Donnelly & Toop, 2011).

5.2 Traffic impact studies. According to MTO, the “main purpose of a Traffic Impact Study (TIS) is to demonstrate how the transportation impacts of a proposed development or redevelopment can be mitigated and addressed in a manner that is consistent with the objectives of the Ministry of Transportation.” (Government of Ontario, Ministry of Transportation, n.d.). The land developer is responsible for providing the TIS, but the terms of reference are agreed to by the developer and the applicable levels of government, with the process overseen by the highest jurisdiction involved (see Table 2). Each jurisdictional level has their own TIS guidelines, creating variations in their levels of consideration for active transportation. The study itself is typically conducted by a consulting firm with engineering and planning expertise.

At all jurisdictional levels TIS guidelines follow a similar analysis process. We focus here on generalizable factors across the various guidelines based on their level of consideration for active transportation. The guidelines reviewed are as follows:

- Ontario (MTO): *General Guidelines for the Preparation of Traffic Impact Studies* (2008)
 - Active transportation consideration: none
- The Regional Municipality of Durham: *Traffic Impact Study Guidelines* (2011)
 - Active transportation consideration: moderate
- The Regional Municipality of Halton: *Guidelines for the Preparation of Traffic Impact Studies* (2001)
 - Active transportation consideration: low
- City of Toronto: *Guidelines for the Preparation of Traffic Impact Studies* (2013)

- Active transportation consideration: high
- City of Mississauga: *Traffic Impact Study Guidelines* (2008)
 - Active transportation consideration: low

The consistent factor that mandates a TIS at any jurisdictional level is the estimated number of additional vehicle trips generated by the proposed development. In general, jurisdictions can mandate a TIS at their discretion, but a TIS considers individual developments only, even when several developments may be in close proximity in the same corridor.

Bicycles and pedestrians may be mentioned in TIS guidelines, but they typically focus on estimating additional motor vehicle trips generated by development and requiring investments to maintain an acceptable LOS for vehicles during peak periods. In this way, TIS guidelines promote the provision of roadway designs according to the logic of LOS measures that seek to maintain vehicle flow during the peak demand for the area. This institutionalizes the flow of resources into prioritizing automotive capacity based on a small period of travel throughout the day.

TIS guidelines also refer to the following supplemental design guidelines, as listed below. These guidelines are based on motor vehicle provisions. They include either simplistic methods for considering active transportation, or none at all.

- Canadian Institute of Transportation Engineers (CITE)
 - *Canadian Capacity Guide for Signalized Intersections* (2008)
- Transportation Research Board (TRB)
 - *Highway Capacity Manual* (2010)
- Institute of Transportation Engineers (ITE)
 - *The Trip Generation Manual* (2012)
- Transportation Association of Canada (TAC)
 - *Geometric Design Guide for Canadian Roads* (1999)

Municipal TIS requirements are written into OPs, TMPs, and Secondary Plans and it is key that these documents require developers to look at all modes of travel, as is done in York Region. For example, if a secondary plan requires a transportation plan (including pedestrians, cyclists, transit), then any development must abide by those policies. If the policy framework does not require the measurement of transit, pedestrian and bicycle LOS, AT impacts will not be evaluated. One barrier is that consultants, developers, and municipalities use different methods, and robust, consistent methods of measuring AT impacts are absent. Additionally, if there is enough vehicular capacity, the TIS process will not consider AT whatsoever. The Province, which requires TIS, could provide further guidance on these issues.

6. Street and Roadway Design Standards and Guidelines

Street design standards and design guidelines have evolved from first being developed for highways, and have slowly been developed toward more urban applications, and finally to better incorporate AT, but they are still well recognized as promoting motor vehicle oriented designs (Southworth and Ben-Joseph 1995). In our discussions with practitioners, we found some confusion and inconsistent use over the use of the term “standard” versus “guideline,” although, in general, the transportation profession has moved away from the idea of standards as design requirements, instead emphasizing the use of some design discretion based on local conditions. (Marshall Macklin Mohaghan Limited, & Intus Road Safety Engineering Incorporated, 2005)

Still, design guidelines are taken extremely seriously. Design guidance on roadway features such as lane widths, turning radii, sight lines, and almost every detail of the roadway environment and its operation are key issue for designers, as professional engineers and municipalities can be held legally liable for unsafe

designs. Guidelines approved by professional engineering bodies are thus highly influential in providing confidence that a design will pass a legal test as being “safe,” even though safety is traditionally measured in terms of the motor vehicle traffic environment, and not necessarily from the perspective of all road users such as pedestrians and cyclists. For example, street designers traditionally consider wider streets and lanes to increase safety. The Transportation Association of Canada 1999 guide states, “In many instances, the more generous a road’s design dimensions are, the safer the road will be; though this is not always true” (TAC, 1999, p. 1.1.1.1). Indeed, research has shown wider streets to increase motor vehicle travel speeds (Brewer et al., 2001), reducing safety for vulnerable road users such as pedestrians and cyclists.

MTO is the governing transportation body in Ontario, but municipal transportation departments govern the design of local roads and streets. These governing bodies draw from a number of design guidelines and documents, particularly street design guidelines and performance measures that are produced by professional engineering groups. The main engineering groups in Canada are the Transportation Association of Canada (TAC) and the Canadian Institute of Transportation Engineers (CITE), which is a chapter of the internationally based Institute of Transportation Engineers (ITE). Other international sources also influence Canadian design practices, such as the American Association of State Highways and Transportation Officials (AASHTO) and Transportation Research Board (TRB). Provincial and municipal governments may adopt and adapt these guidelines and performance measures to fit their local context.

There are three primary aspects of street design of which design guidelines have been created: geometric design, traffic control design and intersection signalization design. This research focused on the most widely accepted Ontario guidelines in each area, inherently focusing on MTO, TAC, and CITE’s guidelines. One of the gaps is that TAC guidelines focus on highways and arterial streets and there are not a set of geometric guidelines for urban streets similar to that produced by the U.S. National Association of City Transportation Officials (NACTO). TAC is, however, currently in the process of updating its *Geometric Design Guide for Canadian Roads* from 1999, a project expected to be completed by April, 2016. This is a potential for guidelines that better incorporate designs that support AT.

In the meantime, American guidelines currently exist that are more oriented toward urban streets, such as ITE’s *Context Sensitive Solutions* (2010) and the new NACTO Urban Street Design Guide (2013). These sources explicitly consider AT in street design including design speed, intersection design, and other street features to provide more context-sensitive guidance. For example, the NACTO document provides detailed plan drawings and designs and documents best practice in contemporary urban street design. These designs include measures to build Complete Streets and slow down and reduce motor vehicle traffic (e.g. curb extensions, green alleys, etc.) However, a brief survey of professionals participating in the focus groups for this study, working in jurisdictions actively promoting AT facilities, suggests that while there is high familiarity with design guidelines in general, there is much less familiarity with newer, more AT oriented documents.

The flexibility of applying existing guidelines was a recurrent theme that came up in this study. In the municipalities in the GTHA that are now “built out,” there is little capacity to build new roads or widen existing ones. This is significant because where there is excess road space it’s relatively easy, both politically and logistically, to install new bike and pedestrian infrastructure. Indeed, the provision of new AT infrastructure is principally happening only as part of large roadway widening projects across much of the region. However, in more constrained contexts, deciding how best to reallocate road space to accommodate AT users, especially bicycles, is a complex balancing act and every millimetre of roadway matters. Typically, municipalities try to squeeze in as much as possible with the least amount of impact on motor vehicle traffic flow and capacity, but this requires being flexible in the use of guidelines and

accepting different dimensions for street elements such as bike lanes, sidewalks and traffic lanes than current guidelines may call for.

How best to implement this flexibility into the street design process is not clear. In a recent consultant report commissioned by the City of Burlington, MMM Group concludes its report by saying that meeting minimum standards is not sufficient to ensure a safe bike facility, and recommends a context-sensitive approach. Despite recommending taking a flexible approach to designing bike facilities, the report cautions that it is a “perilous act” to disregard minimum standards (e.g. TAC’s “Bikeway Traffic Control Guidelines”) since these are “well thought out by a group of diverse transportation professionals, and are applicable in the majority of cases.” (Marshall Macklin Mohaghan Limited, & Intus Road Safety Engineering Incorporated, 2005: 4). This somewhat conflicting advice well demonstrates the conundrum that transportation planners find themselves in when developing designs to accommodate AT users on existing facilities.

In Burlington, research participants reported that municipal planners and engineers are flexible in applying guidelines and believe that design should be context sensitive. They use TAC’s Geometric Design Guide, and plan to soon use the newly released Ontario Traffic Manual (OTM) Book 18 on cycling facilities. Their design work starts with consulting TAC guidelines, but also looks for precedents that go beyond TAC. In the past, the municipality has piloted three-metre lanes in several locations, something not supported by TAC guidelines. The Engineering Division studied European experience with making narrower roads, and other examples including the 2.7 metre lanes on Queen’s Park Crescent in Toronto. Participants reported that doing their design work in house, rather than using consultants, gave them increased flexibility in creating designs.

In York, the Region’s *Road Design Guidelines*, updated in 2013, are the main source of guidance. Lower-tier municipalities within York must conform to regional standards and guidelines, and the region encourages consultants to follow these guidelines when preparing packages for tender. If something is not described in the York Region Road Design Guidelines, or if there are questions, participants in the focus group report that consultants refer first to TAC, which they see as more flexible, and then to MTO guidelines. If guidelines are competing, York Region brings together different disciplines including traffic signal, operations, maintenance, capital delivery group, planning group, urban design group, and as necessary MTO and consultants, to look for solutions.

7. Summary and Recommendations.

Below we summarize some of the main barriers that we identified to better implementing AT facilities as well as make limited recommendations based on these findings.

7.1 Policy. The policy framework for supporting AT has evolved rapidly in Ontario in recent years, with some reference to AT in the Provincial Policy Statement, Growth Plan for the Greater Golden Horseshoe, and The Big Move, the regional transportation plan for the Greater Toronto and Hamilton Area. Still, policy language needs to be further strengthened. For example, the concept of Complete Streets or similar language is still missing from the policy framework at many levels. Some municipalities are moving on this issue. York’s Context Sensitive Solutions is one model. Toronto is also in process of establishing a Complete Streets policy and guidelines.

Funding and coordination through The Big Move could have an important impact on regional active transportation if used to prioritize the completion of gaps in cycling and walking networks. It is also important to note that unlike The Growth Plan, The Big Move does not have statutory status, and it is municipalities that have authority over local land use planning and development, including the development of active transportation facilities outside of Metrolinx facilities and projects.

7.2 Municipal Class Environmental Assessment process. One of the most striking findings of this research was the lack of consensus on either the proper role of the MCEA process in general, or on how the current process works in regard to AT facilities. The MCEA was both seen as policy neutral and as biased towards maintaining designs that prioritize accommodating motor vehicle traffic, mostly in the way that it defines environmental impacts in terms of the impact of potential design on traffic. Which schedule proponents used is not always clear. Depending on the project, this can either prevent the consideration of AT facilities by using a higher or a lower schedule than necessary. For example, the preapproval of some projects was seen as promoting designs without the consideration of incorporating new AT facilities. Finally, specific language in the MCEA was also seen as being auto-centric. For example, road widening is referred to in relation to increasing safety, but narrowing roadways that may improve safety for AT users is not.

Revisions are currently pending for the MCEA as proposed by MEA. In December 2013, municipalities and organizations were invited to provide comments to the proposed revisions. In their formal submission, TCAT expressed support for the recommended changes “with the notable exception of the proposal to streamline the removal or reduction of sidewalks, multi-purpose paths, or bike lanes.” (Smith Lea, 2014) TCAT noted that these amendments do not address one of the primary barriers relating to active transportation, namely that bike lanes and widened sidewalks are only streamlined when they do not impact on motor vehicle capacity. To address this barrier, TCAT recommends that “the Class EA should streamline road projects that reduce capacity for motor vehicles by expanding walking, cycling and public transit capacity.” (Smith Lea, 2014).

Another recommendation we heard in our discussions with practitioners was that there would be benefit in the MEA convening a working group with municipalities that have substantial active transportation project experience to develop relevant and appropriate updates to the MCEA for AT projects. A similar type of group was previously established for transit resulting in a new streamlined environmental assessment process for transit projects established in 2008. Given the lack of consensus on the role of the MCEA on the provision of AT projects, it would be very beneficial to establish such a group.

7.3 Coordination between different levels of government. Upper-levels of government prevent, or do not support, more supportive designs by lower levels. This was seen in interactions with the MTO and municipalities where their facilities intersect, and MTO requires more conservative, auto-oriented designs. It also occurred between Metrolinx and the municipalities and between upper-tier and low-tier municipalities. For example, Halton’s plans designate roadways within the City of Burlington to be widened, even though Burlington sees this as undesirable and too expensive. In these cases, Burlington is trying to use alternative strategies like narrowing travel lanes to create room for bike facilities, although this is not supported by regional policies.

The division of responsibilities for creating AT facilities on regional roads is also sometimes not clear between regional and local municipalities, even though there are consultations between different levels of government. On regional roads, bike facilities and sidewalks that are outside of the actual roadway may be considered a local responsibility and thus may not be included or funded with a regional project.

Both provincial policy and those of the Regional Municipalities should support the alternative strategies used by lower-tier municipalities to produce facilities without road widenings. Likewise, guidance is needed where the design standards of different levels of government do not accord, so that AT facilities are not compromised. In these cases, the allocation of costs also becomes a barrier when lower-levels of government, especially lower-tier municipalities, are burdened with the additional costs necessary to provide facilities to meet the requirements of higher levels of government.

7.4 Funding and Capital Planning. Because AT facilities are bundled as part of large roadway projects, they are funded according to roadway construction priorities. This has two important impacts. One, new cycling facilities are largely being developed on high-capacity roadways designed for higher traffic speeds. These facilities will likely not feel safe for many cyclists and may not attract many new cyclists. Two, when costs are an issue, AT facilities may be seen as “extras” and be cut from budgets. Despite Ontario’s new Cycling Strategy and AT policies in other provincial policies and plans, there are no consistent sources of funding for regions and municipalities to implement AT infrastructure. The Province may even impose more expensive designs on municipalities where they interact with MTO facilities. When retrofitting cycling facilities is needed to adhere to MTO’s standards, the cost implication is too great for municipalities to support.

7.5 Performance measures. LOS continues to emphasize accommodating motor vehicles during peak operations, despite provincial and regional policies to change mode use away from motor vehicles. The use of LOS is highly institutionalized in traffic planning, including in common software packages such as *Synchro*, and is a key input to transportation planning and roadway design decisions. Thus, the current use of LOS measures continue to prioritize the building and expansion of high-capacity roadways, environments that may be detrimental to AT. Similarly, TIS are designed to accommodate motor vehicle traffic generated from new development. Like LOS, methodologies for considering active transportation are lacking. TIS works along with, and very much uses the same logics as LOS.

In general, better measurement tools are needed. In the meantime, the use of tools and guidelines like *Synchro* and *The Highway Capacity Manual*, should be reviewed in detail to better understand how they may generate roadway designs that are not supportive of AT, and thus difficult to align with policy. We note that Trafficware recently released *SynchroGreen* which claims to take “a holistic approach when optimizing traffic signals by considering side-street and pedestrian traffic” (Trafficware, n.d.) This is potentially a positive development, although we found no evidence of its use as of yet in the GTHA and the consideration of bicycles is also still absent in the software. A more focused review of the impacts of the current use of LOS for planning and designing support AT facilities was beyond the scope of this project, but is a clear area that should be better understood.

7.6 Standards and Design Guidelines. Street and roadway design guidelines are extremely influential for practitioners and help municipalities and consultants have confidence that their designs will pass legal liability claims in terms of safety. In general, however, they continue to be oriented toward accommodating motor vehicles, including in the ways they conceptualize safety.

The updated Bikeway Design Manual, OTM Traffic Manual (Book 18), and the Ontario Cycling Strategy show that municipalities, regions and the province recognize the need for a new approach to road design, but there is no current state-of-the-art guidelines that fully incorporate AT into street design developed by influential Canadian organizations such as TAC. TAC is currently updating its Geometric Design Guide for Canadian Roads from 1999, which gives some opportunity to promote designs that incorporate and support the needs of AT.

Many practitioners that participated in this project were not familiar with the most recent U.S. examples of guidelines that focus on AT, even though they were generally very knowledgeable and supportive of AT. One example of guidelines that include more Complete Street approaches for urban contexts is NACTO’s recently published Urban Street Design Guide.

Municipal practitioners reported that MTO standards are not sufficiently flexible and do not reflect the needs of municipalities. Likewise, lower-tier municipalities may also need more flexibility in designing AT infrastructure, especially where they cannot or do not desire to widen roadways, and therefore, cannot provide AT facilities as part of widening projects.

Guidelines give flexibility, but deviating from guidelines raises liability issues and increases project design costs. As a result, consulting firms need direction from municipalities to develop less conventional designs that deviate from standard guidelines. These increased design costs also need to be budgeted. Some study participants believed that municipalities that produce their designs in-house were better able to be flexible in their designs than those that rely on consultants, but there was not consensus on this point.

TAC is currently in the process of updating its *Geometric Design Guide for Canadian Roads* from 1999, a project expected to be completed by April, 2016. This is an important opportunity to promote guidelines that incorporate and support the needs of AT. To produce guidelines that incorporate state-of-the-art ideas about urban streets that fully support AT, the province and/or Metrolinx should be involved in this update. Ideally, a specific set of agreed-upon guidelines for designing active transportation infrastructure in the GTHA municipalities is needed, similar to NACTO's Urban Street Design Guide and Urban Bikeway Design Guide. This would help address issues around design safety and legal liability. Also, NACTO is actively seeking official endorsements of its guidelines. If MTO were to provide such an endorsement, this would represent a useful first step in legitimizing their use. In the meantime, training and education should be improved so that practitioners are fully aware of existing state-of-the-art guidance, such as that produced by NACTO. A fuller assessment of the ways current guidelines are used in practice that create barriers to AT should also be conducted.

8. Conclusions

Both policy and practice aimed at incorporating facilities for AT as part of roadway projects in the GTHA are evolving rapidly. From better language in the Provincial Policy Statement, to the more specific guidance in York Region's Context Sensitive Solutions document, to the current development of a Complete Streets policy and guidelines in Toronto, the policy context is increasingly oriented toward promoting better environments for AT. Facilities are also being built in places that would not have been expected a decade ago. Both the Regional Municipality of York and Halton Region, for example, are in the process of building extensive cycle networks along their regional roadways.

Overall, however, we find that despite high level policies that encourage AT, institutionalized barriers continue to exist that promote roadway design primarily oriented toward accommodating motor vehicles. In some cases, such as the MCEA, there is not consensus on how the process does and does not create barriers to AT, nor how the process *should* work. The promotion of motor vehicle roadway design in other cases, such as the standardized and often mandated performance measures such as LOS and TIS, was much clearer. Complex interactions between different levels of government, the ways that the capital budgeting process works, and other aspects of how roadways are financed, designed, and produced all interact to produce environments that continue to prioritize the accommodation of motor vehicles, sometimes despite policy.

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10. Tables

Table 1 AT in TMPs in Four Regional Municipalities in GTHA

Regional Municipality TMP	AT/ Walking and Cycling
<p>Regional Municipality of Durham Transportation Master Plan (2003)</p>	<p>“Walking and cycling alternatives should be promoted through supportive urban and road design, provision of appropriate facilities, such as dedicated paths and paved road shoulders, and education about routes and the benefits of active living. The TMP recommends the development of a Regional Bicycle Plan, and consideration of the needs of cyclists and pedestrians in the planning, design, construction, maintenance and operation of the Regional Road network.” (p.3)</p> <p>“Recommendations: Develop a Regional Bicycle Plan in consultation with the Local Municipalities, the Ministry of Transportation and other stakeholders ... Develop guidelines for ensuring the needs of pedestrians and cyclists are considered in the planning, design, construction, operation and maintenance of the Regional Road network.” (3.2.3 Walking and Cycling, pp. 29-31)</p>
<p>Regional Municipality of York Transportation Master Plan Update 2010</p>	<p>“The TMP Update in combination with the Pedestrian and Cycling Master Plan (April 2008) and Regional Official Plan has an objective to reduce automobile dependence by enhancing opportunities for residents and workers to walk, cycle, take transit, and carpool.” (p. 8)</p> <p>“A goal of the TMP Update was to promote alternative modes of transportation through its focus on active transportation and transit as priorities to achieve a more sustainable urban form.” (p. 1)</p>
<p>Regional Municipality of Peel Transportation Master Plan (2012)</p>	<p>OP amendments include stronger language around active transportation, e.g. “to encourage and support the development of safe, accessible, attractive and integrated network of bicycle and pedestrian facilities ...” (p. 125)</p> <p>AT initiatives include: The development of AT master plan with all municipalities and social marketing strategies to promote walking and cycling.</p>
<p>Regional Municipality of Halton Transportation Master Plan (2011)</p>	<p>“All of Halton’s Local Municipalities have undertaken the development of Active Transportation/ Cycling/ Trails Plans as outlined ...” (p. 18)</p> <p>“The Regional Road Right of Way Guidelines include within an urban setting the accommodation of a 4.2metre curb lane and/or on road cycle lanes at 1.8metres wide to accommodate cyclists. On rural roads, 2.5 metre partially paved shoulders are provided with a 1.5 metre paved bike lane to accommodate cycle usage. The application of the Right of Way Guidelines will be confirmed through further implementation related studies including the Class Environmental</p>

	<p>Assessment process” (pp. 17-38).</p> <p>“4.3.1 Active Transportation</p> <p>To increase the use of Active Transportation (AT) a well connected, safe and functional transportation network consisting of sidewalks/multiuse paths, designated bicycle lanes, separated bicycle lanes, wider paved shoulders and off road trails is required. Initiatives associated with education, planning, design and infrastructure development need to be closely coordinated with Halton’s Local Municipalities. AT is being promoted as a year round travel mode option that should be available for all members of the community.” (p. 26)</p> <p>“The policy target assumed in the TMP of a 5 percent mode split for Active Transportation by 2031 can be realized through investments in walking and cycling infrastructure and the introduction of policies to encourage shifts from auto travel to active modes for trips less than 10 kilometres in length.” (p. 33)</p> <p>“8.2.1 Active Transportation</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • The Regional Active Transportation Advisory Committee to pursue a coordinated approach to non-motorised travel needs across the Region; and • A detailed Region-wide Active Transportation Master Plan to be developed to establish a strategy defining educational and outreach initiatives and infrastructure improvements (e.g. sidewalks, multi-use paths, separated bicycle lanes) to promote increased non-motorised travel throughout the Region.” (p. 62)
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Table 2: Jurisdictional road responsibilities

Level of Jurisdiction	Type of Roads
Province	Freeways and provincial highways
Region	Regional roads, transit facilities, most arterials, and municipal arterials that affect regional roads
Municipality	Some arterial roads, collector roads, local roads, sidewalks, bicycle facilities, and trails

11. Figures

Figure 1. York Region Diagram of Road Planning Process

