

“The Next Stop is... Inaccessible. Inaccessible Stop.”

GTHA Transit System Maps Coded for Accessibility

**PATRICIA KIERANS**

**Supervisor's Name:** Rachel Gorman

**Advisor's Name:** Marcia Rioux

**Supervisor's Signature:**



**Date Approved:**

June 16, 2017

**Advisor's Signature:**



**Date Approved:**

June 16, 2017

**A Research Paper Proposal submitted to the Graduate Program in Critical Disability Studies in partial fulfilment of the requirements for the degree of**

**Master of Arts**

**Graduate Program in Critical Disability Studies**

**York University**

**Toronto, Ontario**

**M3J 1P3**

June 2017

## Table of Contents

<b>ABSTRACT</b>	<b>III</b>
<hr/>	
<b>INTRODUCTION</b>	<b>1</b>
<hr/>	
WANDA AND WALDO	1
CONTEXT FOR RESEARCH	2
SUMMARY OF BACKGROUND RESEARCH	3
TERMINOLOGY	3
TRANSIT PRECEDENTS FOR THE GTHA	4
THEORETICAL FRAMEWORKS	14
RESEARCH QUESTIONS	15
<b>METHODOLOGY</b>	<b>17</b>
<hr/>	
THEORETICAL FRAMEWORKS	18
AODA	18
UN-CRPD	20
DILLER’S CIVIL RIGHTS MODEL	21
<b>DATA ANALYSIS</b>	<b>22</b>
<hr/>	
RETURN TO WANDA AND WALDO	22
CREATION OF MAP	22
ANALYSIS PER CITY	27
HAMILTON: 4.5%* ACCESSIBLE	27
BRAMPTON: 63% ACCESSIBLE	29
OAKVILLE: 55% ACCESSIBLE	31
MILTON: 0%* ACCESSIBLE	32
DURHAM: 72% ACCESSIBLE	33
BURLINGTON: 100% ACCESSIBLE	34
GO TRANSIT STATIONS: 58% ACCESSIBLE – BUS STOPS 36% ACCESSIBLE	35
MISSISSAUGA: 96% ACCESSIBLE	36
YORK TRANSIT: 66% ACCESSIBLE	36
TTC: 74% ACCESSIBLE	37
GTHA TRANSIT THROUGH THE LENS OF THE AODA	38
CRPD FRAMEWORK ANALYSIS	43
DILLER FRAMEWORK ANALYSIS	44
<b>CONCLUSION</b>	<b>46</b>
<hr/>	
NEXT STEPS	49
<b>REFERENCES/BIBLIOGRAPHY</b>	<b>53</b>
<hr/>	

## **Abstract**

This thesis bridges a vital gap in accessible transit information across the Greater Toronto and Hamilton Area (GTHA), by providing customized Google Maps whose transit stops are filtered according to accessibility. The current lack of such maps among the agencies was examined through three vital frameworks: the Accessibility for Ontarians with Disabilities Act (AODA), the United Nations Convention on the Rights of Disabled People (CRPD), and Diller's Civil Rights Model.

After careful analysis, the AODA proved to have no requirements regarding the publishing of accessibility information. The AODA's Transportation Standard is criticized by the Ontario Human Rights Code as violating human rights standards, and making no steps forward to positively integrate people with disabilities into society. The CRPD's requirements that every signing nation must provide accessible environments, and access to information about accessibility, goes further to include a directive to constantly continue improving accessibility. Diller's Civil Rights Model sinks the case of the GTHA's transit agencies even further: his model lays the responsibility to provide equal access on individual corporations themselves, as well as the government.

It is clear, via these frameworks, that the GTHA's transit agencies have not done enough to ensure equality of access to accessibility information, although they may meet the AODA's general transportation requirements. It was a critical oversight of the AODA that no requirement for the communication of accessible transportation information was included. Pressure must be put on these transit agencies, as well as the provincial government, to modify their existing transit maps to include the accessibility

of transit stops, or to create new maps that specifically highlight accessibility information. It is my intent that this research should make a positive contribution to this process.

## Introduction

### Wanda and Waldo

A hypothetical brother and sister, Wanda and Waldo, live separately in Hamilton, ON, but wish to visit their parents in Oshawa, ON. Waldo has a mobility impairment that necessitates using a wheelchair. Since they cannot afford a car, Wanda and Waldo must take public transit. To find the route information to get to and from their parents' home, they enter their departure and arrival locations into *Triplinx*, Metrolinx's proprietary trip-planning software, that spans the entire Greater Toronto and Hamilton Area (GTHA).<sup>1</sup> Wanda's trip is straightforward; she boards a local Hamilton bus to the GO station, arrives in Oshawa, and takes another bus to within a block of her parents' house. Waldo faces a significant hurdle; because he uses a wheelchair, he must click on the "Accessible trip [sic]" setting before receiving trip directions.<sup>2</sup> Instead of being directed to an accessible bus stop, the instructions direct Waldo to "Walk 5.7km"<sup>3</sup> to the local GO station.

In contrast to Hamilton, the city of Oshawa has provided accessible transit information to *Triplinx*, which directs Waldo to board the same bus as Wanda once he arrives in Oshawa. Due to the lack of accessible transit directions in Hamilton, Waldo abandons *Triplinx*'s recommendation to "walk" to the GO Station. His local knowledge allows him to board a bus at an accessible stop near his home, but a visitor to Hamilton, who requires accessible transit, might not be able to do the same. Waldo is able to

---

1. Metrolinx. "Trip Planner - Search form." *Triplinx.ca*. 2017. <https://www.triplinx.ca/en/trip-planner/4/JourneyPlanner>.

2. Ibid.

3. Ibid.

navigate from his home to his parents' home independently, across several municipalities, due to his familiarity with local transit. However, he does not have access to a universal map for guidance and to make his trip planning more efficient; furthermore, at the time of publication, no apps or software exist to indicate accessible bus stops and routes in Hamilton that would bring him to the Hamilton GO Centre. This lack of resources would have an even greater negative impact for a tourist or visitor to Hamilton.

### Context for Research

The Government of Ontario's stated goal relative to transit accessibility is: "Ontario's [...] action plan [is to] becom[e] accessible for people with disabilities by 2025."<sup>4</sup> Pressure is mounting for public agencies to finish introducing all programs or features relating to accessibility by this deadline. This includes public conventional transportation services, which must have met requirements for pre-boarding announcements,<sup>5</sup> and on-board announcements, by January 1, 2017.<sup>6</sup>

Currently, only discrete maps exist for each conventional transit agency in the GTHA exist, with the overlaps between abutting transit agencies indicated at transfer stations. Though individual transit agencies may highlight some accessibility features on their own maps, usually at transit hubs, the information does not provide a comprehensive picture of the ability for individuals with mobility impairments to travel

---

4. "Accessibility Laws." *Queen's Printer for Ontario*. 2017. <https://www.ontario.ca/page/accessibility-laws>.

5. Government of Ontario. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS." *E-Laws*. July 1, 2016. <https://www.ontario.ca/laws/regulation/110191>, s. 51 (4).

6. *Ibid.*, s. 52 (5).

across the entire GTHA transit region. At present, there is no cross-regional transit map that highlights the accessibility of individual stops and stations in the GTHA. The research for this MRP will combine the data for each of the nine major, local transit agencies, as well as the provincial/regional Metrolinx Transit agency, into digital maps that are capable of highlighting all accessible stops and stations across the GTHA.

### Summary of Background Research

#### **Terminology**

Most transit-based research uses the term ‘accessibility’ to mean access to transit for the general population, not for people with disabilities. By ‘access’, they mean “Does a neighbourhood have access to transit?” This does not address access for people with disabilities, specifically individuals with mobility impairments, which is how I have defined the term ‘accessibility’ and ‘access’ in this MRP.

Throughout the MRP, I use the term ‘Cross-Agency Travel’ (CAT) to refer to any public transit service that takes a rider from one geographic or municipal jurisdiction to another via two or more discrete transit providers. Cross-boundary maps span these jurisdictions to provide seamless information to riders. For example, a rider with a mobility impairment, like Waldo, who wishes to travel from Hamilton to Oshawa, would have to board vehicles from at least three discrete agencies, which would necessitate three different transit maps. An able-bodied person, like Wanda, would be able to use one integrated CAT map on *Triplinx*<sup>7</sup> to plan their trip, but, to date, nothing exists to

---

7. Metrolinx. "Trip Planner - Search form." *Triplinx.ca*. 2017. <https://www.triplinx.ca/en/trip-planner/4/JourneyPlanner>.

assist individuals with disabilities to plan their trip in its entirety. The goal of this MRP is to create an Accessibility-Focused Map (A-FM), for the GTHA.

The GTHA currently has nine independent, municipal transit agencies, each covering a separate geographic area. They each provide bus services, and the Toronto Transit Commission (TTC) also provides Light Rail Transit (LRT) and three subway lines. Eight of nine agencies also provide paratransit. Metrolinx, a provincial transit agency, delivers services to and beyond the geographic areas covered by the nine other municipal agencies.

### **Transit Precedents for the GTHA**

To precede my research, I explored several themes to lend context and background to my work.

The first theme explored three cities, Washington D.C., New York City, and Minneapolis-St. Paul (M-SP), that have implemented some form of CAT. Each of the three cities studied present successes and challenges with regard to providing accessible transit. By looking at how they progressed, the decisions they made, and the challenges they faced, the transit agencies across the GTHA, can see what can go wrong, what to focus on, and what will enhance accessibility within public transit.

Washington D.C. provides a true best practice for fully-accessible, cross-boundary travel, though it did not have to negotiate between multiple agencies.<sup>8</sup>

---

8. "Accessibility | WMATA." Accessibility | WMATA. <https://www.wmata.com/service/accessibility/>.

Washington's transit authority, WMATA, designed all of their transit systems to be fully accessible, rather than adding that feature as an afterthought.

The GTHA can draw the conclusion from New York City that inter-agency cooperation is possible and profitable by looking at the MTA's success. The interstate economy between New Jersey and New York, as tracked by each, shows a large portion of tourism economy comes from people living near their destination state. Given the effectiveness with which tourists and commuters can travel between New Jersey and New York via the MTA, it is an obvious conclusion that inter-agency cooperation has led to economic benefits.

M-SP drives home the importance of a comprehensive network that spans across the entire city. M-SP faces a challenge unlike Toronto: the historical segregation of its transit routes. Neighbourhoods with lower socio-economic status (populated by discriminated groups) were offered limited bus service, and no option for rail transit. Those inequalities are finally being addressed, in an ambitious plan set in motion by the M-SP city council. The plan aggressively expands rail lines into neighbourhoods that did not enjoy such service previously, and links these neighbourhoods to areas with a need for employees (e.g. in manufacturing). That this connection did not exist before, to transport unemployed workers to jobs requiring their skills, demonstrates that a well-planned, all-encompassing transit system leads to greater economic equality.

The transit agencies in the GTHA can draw from these three cities a plan to improve inter-agency connections, so as to maximize current strengths and provide seamless cross-agency travel for all riders. This will benefit the GTHA's economy as a

whole, and improve the quality of life for all residents, with a significant positive impact for the disabled.

The second major theme that emerged from my research was Cross-Agency Transit (CAT) maps, and whether those maps currently fulfill accessibility-related needs. A CAT map that connects collaborating agencies' zones of operations puts all relevant cross-agency information into one map. Riders can use this CAT Map to maximize the ease and speed of their journey, by helping them determine the most efficient route of travel.

Indicating accessible stops on these CAT maps would further the benefit of the map for people with mobility impairments, which will be discussed at length throughout the MRP.

The wheelchair-icon (see Figure 1) indicates universally-accessible stops or stations that a person, who uses a wheelchair or another mobility-related device, can navigate independently and safely. As in Figure 1's example of the use of this icon by the TTC on their subway map, this dot is difficult to read for any rider, as the dot itself is very small when printed. Most transit agencies in North America have not created or published transit maps dedicated for the use of people with a mobility impairment or other disabilities. Because many public transit stations are not accessible, an A-FM indicating these stations would allow individuals with any mobility impairments to determine whether they would be able to use that station, or whether they would need to find an alternate route, or use paratransit for their journey.

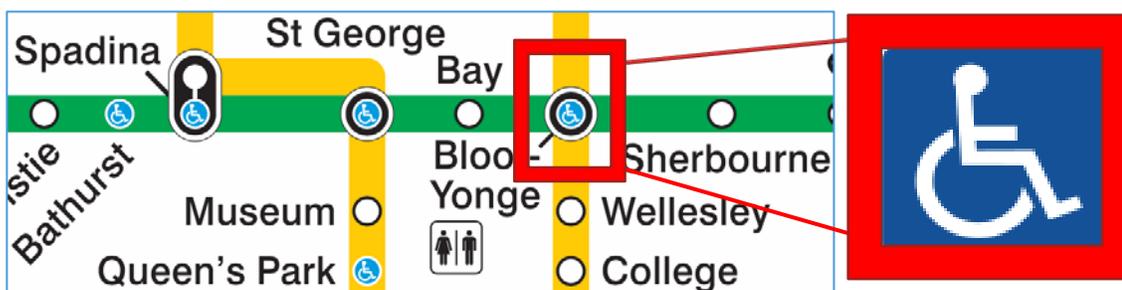


Figure 1: Currently, TTC maps indicate that a station is universally accessible by positioning the universal symbol for accessibility, an icon of a wheelchair, inside the dot that indicates the location of the station (see Figure 2).<sup>9</sup>

Currently, in the GTHA, none of the nine agencies (nor Metrolinx) have comprehensive A-FMs. For example, the TTC indicates accessible subway stations, but does not indicate which streetcar and bus stops are accessible (see Figure 2).

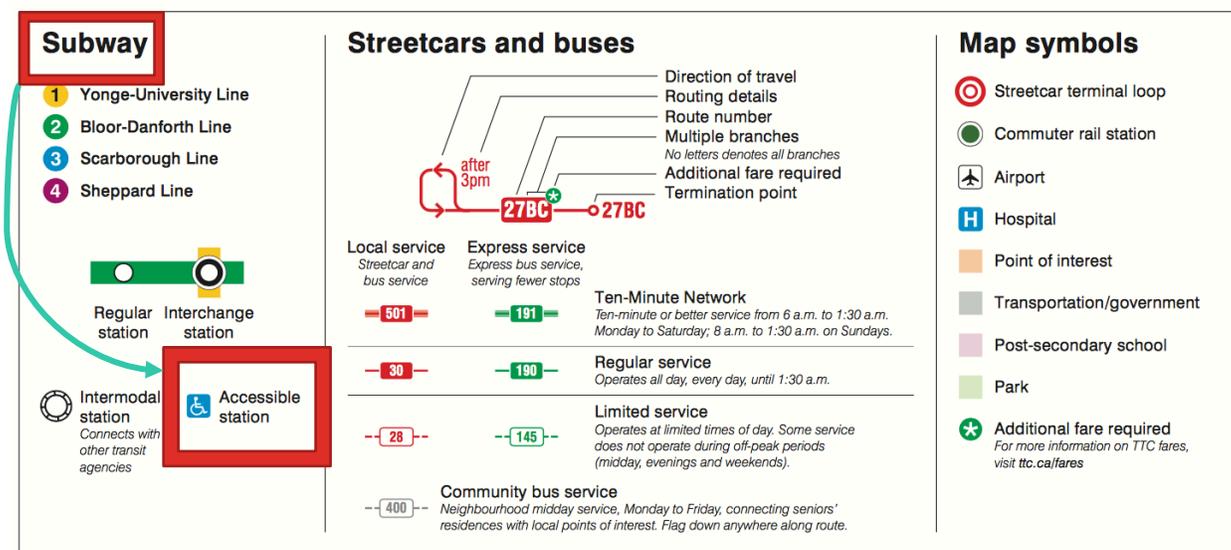


Figure 2: Legend from the “TTC System Map”; accessible subway stops have the wheelchair symbol inside the circle indicating the station, however Streetcars and buses do not have any accessibility information included on the map.<sup>10</sup>

Another example in the GTHA of a transit system lacking in accessibility is the Hamilton Street Railway Company (HSR), which runs exclusively with buses<sup>11</sup>. The

9. "TTC Subway Map." April 2015. [https://ttc.ca/PDF/Maps/Subway\\_Map.pdf](https://ttc.ca/PDF/Maps/Subway_Map.pdf).

10. "TTC System Map." *Toronto Transit Commission*. January 01, 2017. [https://ttc.ca/PDF/Maps/TTC\\_SystemMap.pdf](https://ttc.ca/PDF/Maps/TTC_SystemMap.pdf).

11. "Hamilton Street Railway System Map September 2016." *City of Hamilton, Ontario, Canada*.

HSR indicates each bus route separately, and each individual route has its own paper map with routes and stop times. They have never completed a physical survey of their 2515 bus stops to evaluate which ones fit minimum accessibility requirements and which do not<sup>12</sup>. As such, neither the paper nor online route maps include accessibility information. On the HSR's trip planning website, when the user clicks on a bus stop for information, there is a section labeled "Amenities" which should include accessibility. However, every stop has "N/A" listed beside amenities (See Fig. 4). Only those with local knowledge, or access to Google Street View, will be able to know whether or not they can access a certain area independently, or whether they would need to take paratransit.

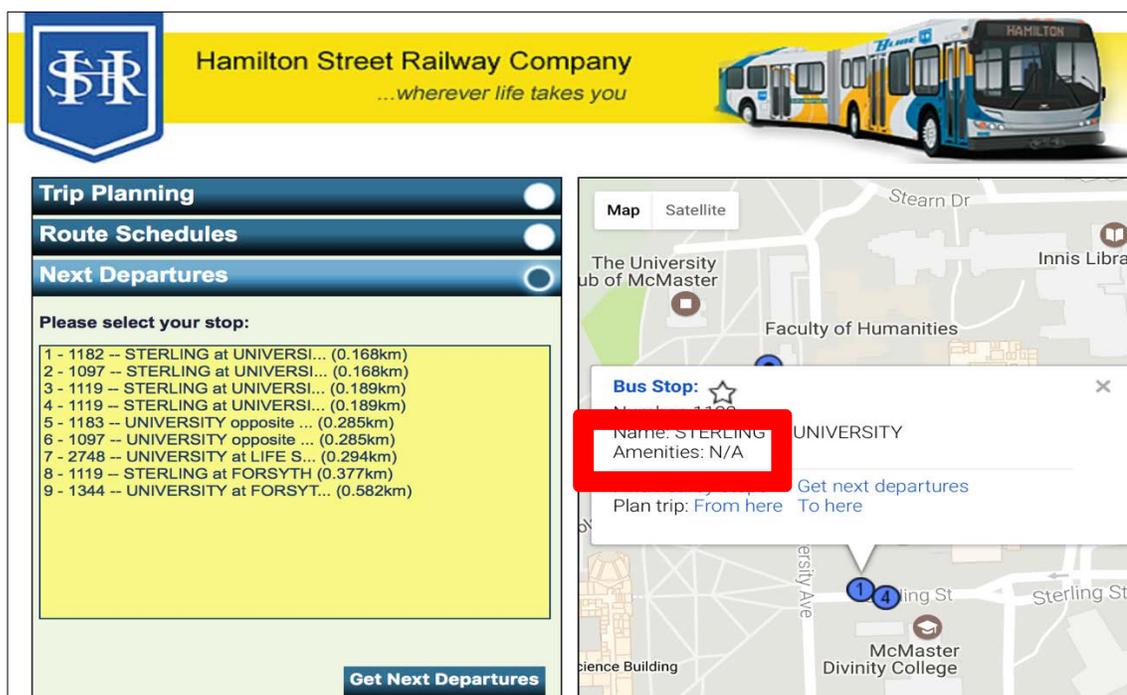


Figure 3: A screenshot of the interactive Hamilton Street Railway map, with a random bus stop selected. Information is provided for each bus stop, including the stop number, the name, and any amenities. Every bus stop has "N/A" beside the Amenities, instead of

September 2016. [https://d3fp1lf1m7bbt3.cloudfront.net/sites/default/files/media/browser/2016-02-16/hsrssystemmap\\_sept2016.pdf](https://d3fp1lf1m7bbt3.cloudfront.net/sites/default/files/media/browser/2016-02-16/hsrssystemmap_sept2016.pdf).

12. "Hamilton Street Railway System Map September 2016."

whether the stop is accessible or not.<sup>13</sup>

One city in Europe has taken a dramatic step forward with its transit map, prominently displaying accessibility filters in its main online transit map: Paris and its transit agency, RTAP.<sup>14</sup> Citymetric, an arm of the *New Statesman* British magazine that focuses on urbanism issues and events, evaluated the website and found that, although RTAP's system is largely not accessible to people with mobility impairments, their online filters were excellent, and clearly delineated which stops could accommodate different needs.<sup>15</sup>

---

13. "Hamilton Street Railway Next Departures." *City of Hamilton, Ontario, Canada*. 2017. [http://www.busweb.hamilton.ca:8008/hiwire?.a=iNextBusSelectStop&Geocode=-79918422%3B43262300&type=Stop&locDetail=STERLING at UNIVERSITY&IvrNum=1182&stopName=STERLING at UNIVERSITY](http://www.busweb.hamilton.ca:8008/hiwire?.a=iNextBusSelectStop&Geocode=-79918422%3B43262300&type=Stop&locDetail=STERLING%20at%20UNIVERSITY&IvrNum=1182&stopName=STERLING%20at%20UNIVERSITY).

14. "Plan Interactif des transports en Ile-de-France." January 2017. <http://www.ratp.fr/plan-interactif/carteidf.php?lang=uk>.

15. Tate, Amelia. "This is what the Paris metro map looks like if you're in a wheelchair." *CityMetric*. June 18, 2015. <http://www.citymetric.com/transport/what-paris-metro-map-looks-if-youre-wheelchair-1153>.

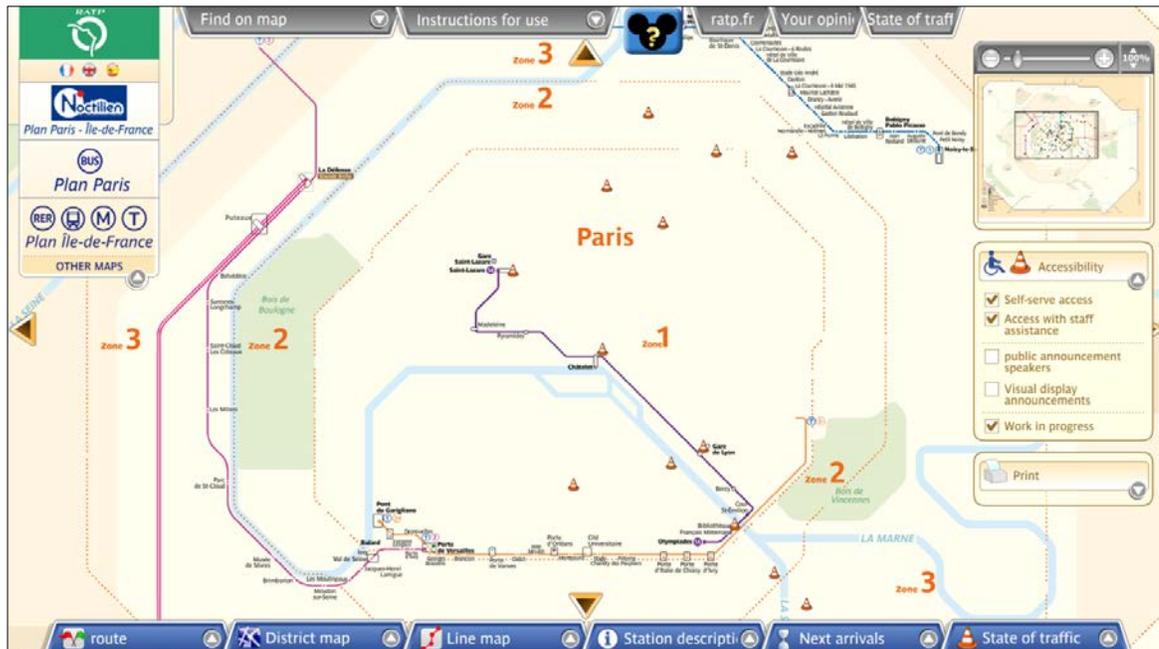


Figure 4: A screenshot of the interactive RATP map, as available on a web browser. Paris is divided into roughly circular zones for fare rates. On the right hand side of the map, already expanded when the map is opened, is the Accessibility/Construction filter table. To illustrate how the map looks for a person with a mobility impairment who requires self-serve access, or access with staff assistance, both boxes have been checked off. The construction, or ‘work in progress’ option, is also checked off, as construction may have unforeseen effects on overall accessibility. The result is the disappearance of most of Paris’ subway lines, with one subway line running northwest to southeast across Paris, parallel to the Seine river, and one heavy rail line in zone 3 remaining.<sup>16</sup>

Paris’ online trip-planning software has four filters that allow people with disabilities to filter stations based on their individual needs and to reduce visual noise. Two filters relate to physical access, like elevators or personal assistance. The two other filters relate to sensory notifications, including audio and visual stimulants. If a potential traveler chooses one of these filters, all routes that do not possess that feature automatically disappear from the map. At present, using any of the filters highlights Paris’ inaccessible transit system; however, their willingness to include those filters

16. "Plan Interactif des transports en Ile-de-France."

indicates their intention to build in accessibility features in the future, so that the filter will be of more use as time goes by.<sup>17</sup>

Very few agencies are publishing CAT (Cross-Agency Transit) maps, with the exception of Washington DC and New York City. Furthermore, Paris is the only city actively promoting A-FMs (Accessibility-Focused Maps). The middle of this Venn Diagram should be the GTHA, which could incorporate both the cross-agency component, as well as the accessibility component, so that, at a glance, or with the appropriate filter, any rider could immediately see exactly which lines or stops are accessible, and then could travel to their destination across multiple regions.

The final theme to emerge from my research focuses on the GTHA's agencies' parallel initiatives, called the Family of Services (FoS). The FoS' stated goal is to gradually shift paratransit riders back into the conventional transit system; that is becoming universally accessible, in compliance with the government's goal of making transit "accessible for people with disabilities" by 2025.<sup>18</sup>

This will be accomplished as each agency finishes upgrading their fleets, in accordance with AODA requirements, to buses and rail cars that are fully accessible and have designated accessibility seating, making their conventional transit system universally accessible. The goal of the FoS is to divert paratransit riders who are able to use universally accessible conventional vehicles away from door-to-door paratransit services, which are currently overwhelmed by new applicants and a growing number of

---

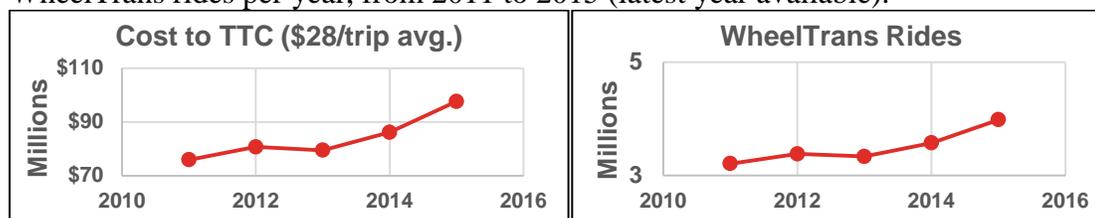
17. "Plan Interactif des transports en Ile-de-France."

18. "Accessibility Laws." *Queen's Printer for Ontario*. 2017.  
<https://www.ontario.ca/page/accessibility-laws>.

trip requests. For example, between 2014 and 2015, the number of active Wheeltrans users increased from roughly 35,000 to 45,000.<sup>19</sup>

Currently, paratransit agencies find themselves in a fiscally untenable position. Wheel-Trans charges the same fee for a single paratransit ride as they do for a conventional ride (\$3). The TTC absorbs the remainder of the cost. By 2012, according to the Auditor-General's report on Wheel-Trans, the average cost of a one-way trip was \$31 in Toronto;<sup>20</sup> removing the passenger's contribution of \$3 leaves the TTC to assume the remaining \$28. Projecting this data to the most recent statistics for passenger trips from 2015, of a total of 3.487 million rides,<sup>21</sup> the cost of WheelTrans rides as paid out by the TTC is \$97.64 million dollars.

Figures 5 & 6: Graphs of the cost of WheelTrans rides, and the total number of WheelTrans rides per year, from 2011 to 2015 (latest year available).<sup>2223242526</sup>



19. "About the TTC: Operating Statistics 2015: Section One." *Toronto Transit Commission*. April 19, 2016. [https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2015/Section\\_One.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2015/Section_One.jsp).

20. Griffiths, Jeffrey. "Auditor General's Report: Review of Wheel-Trans Services - Sustaining Level and Quality of Service Requires Changes to the Program." *Association of Local Government Auditors*. December 6, 2012. <https://algaonline.org/DocumentCenter/View/1295>.

21. "About the TTC: Operating Statistics 2015: Section One." *Toronto Transit Commission*.

22. "2011 TTC Operating Statistics." *Toronto Transit Commission*. 2012. [https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2011.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2011.jsp).

23. "2012 TTC Operating Statistics." *Toronto Transit Commission*. 2013. [https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2012.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2012.jsp).

24. "2013 TTC Operating Statistics." *Toronto Transit Commission*. 2014. [https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2013.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2013.jsp).

25. "About the TTC: Operating Statistics 2014: Section One." *Toronto Transit Commission*. 2015. [https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2014/Section\\_One.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2014/Section_One.jsp).

26. "About the TTC: Operating Statistics 2015: Section One." *Toronto Transit Commission*.

FoS aims to divert passengers who are capable of using universally-accessible transit back to the mainstream system, and to use paratransit for the first leg and last leg of their journey, to get them from their door or curb to the nearest accessible transit stop, and vice versa. There will be some individuals who will continue to be able to rely on paratransit services for the entire duration of their trip as necessary, but by easing the burden on current paratransit services, their needs will be met with greater efficiency.

For the FoS to be successful, it has to be as accessible as possible at every level. In order to easily access transit, it must be accessible, and riders must also know how to access information about how to take accessible transit. Riders with mobility impairments, or other disabilities, need to be encouraged to use universally-accessible services; in order to use these services, they must be easily accessed. Having AFMs, both physical and online, will be essential to improve accessible transit services.

In reality, accessibility is an issue that will affect most people over the course of their lifespan, whether due to physical injury or illness, caring for another with an impairment, use of a stroller, or carrying luggage. As Baby Boomers age, so, too, will the number of riders who would currently benefit from an A-FM. For this reason, it is necessary to ensure that maps have clear accessibility indicators for all future transit mapping projects.

## Theoretical Frameworks

There are three major frameworks which provide focus and context for this research: the Accessibility for Ontarians with Disabilities Act (AODA),<sup>27</sup> the United Nations Convention on the Rights of Persons with Disabilities (UN CRPD),<sup>28</sup> and Diller's Civil Rights Model.<sup>29</sup> I will analyze my research through these three lenses to determine how the GTHA's transit measures up.

The AODA takes a microscopic approach to specific accessibility situations; however, during its development, conflicts between contributing parties led to compromise and critical gaps in coverage. The CRPD is a ratified international resolution promoting accessibility in all aspects of life, in a more general, goal-oriented and macroscopic manner. Diller's model is a distillation of the CRPD's goals, and crystallizes the responsibilities of governments and businesses, bypassing special interests. It is the responsibility of the organization, according to Diller, to make society and the built environment equally accessible in every possible way.

The AODA, brought into law in 2005, created Ontario Regulation 191/11, also called the "Integrated Accessibility Standard".<sup>30</sup> Regulation 191 covers all manner of accessibility issues, but most relevant to this MRP is the Transportation Standard. The Transportation Standard has multiple requirements that addresses transit stops, signage, and the accessibility of stops. There is no mention of making accessibility information

---

27. Government of Ontario. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."

28. "Convention on the Rights of Persons with Disabilities and Optional Protocol." United Nations. December 13, 2006. <http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf>.

29. Diller, Matthew. "Judicial Backlash, the ADA, and the Civil Rights Model." *Berkeley Journal of Employment and Labor Law* 21, no. 1 (March 2000): 19-52.  
doi:<http://dx.doi.org/doi:10.15779/Z38H340>.

30. Government of Ontario. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."

about transit stops available to passengers, either during the journey, or as information available for journey planning.

The UN CRPD was crafted with contributions from disabled communities and organizations all around the world, from the Global North and the Global South.<sup>31</sup> The result was a comprehensive and official recognition of the social, environmental, and attitudinal barriers that people with disabilities face. Signing nations are required to pursue a variety of equalization measures, and, most relevant, to this research, include accessible dissemination of information, accessible transportation, and accessible information about that transportation.

In Diller's Civil Rights Model, Diller states that "employers and public institutions have a responsibility to facilitate [...] social integration of people with disabilities".<sup>32</sup> This responsibility becomes vital when bridging transportation networks that span across several municipalities, and the signage and mapping that reflect it.

By measuring the GTHA's current transit conditions against these frameworks, I will be able to see where the GTHA has been successful in meeting accessibility needs and standards, and where they have fallen short.

### Research Questions

My research in this MRP addresses the following research questions:

- Is the current (broader GTA-wide) system accessible through the lens of AODA, the CRPD, and the Diller's Civil Rights Model? (i.e. a three-part evaluation)

---

31. "Convention on the Rights of Persons with Disabilities and Optional Protocol."

32. Diller, Matthew. "Judicial Backlash, the ADA, and the Civil Rights Model."

- Based on this three-part evaluation, what changes need to be made?
- What changes need to be made in order to satisfy the CRPD? Would these changes exceed (or be different than) the changes that need to be made to ensure AODA compliance?

By analyzing these three questions, this MRP will draw attention to areas of accessibility in public transit. These areas must be addressed for the GTHA to provide the example riders Wanda and Waldo with easy access between their parents, jobs and homes, along with accurate and reliable information about how to travel efficiently.

To determine this, I created a series of maps, one for each of the transit agencies and GO Transit. The maps indicated each transit stop, and whether or not they were accessible for people with mobility impairments. I then analyzed these maps using each of the three frameworks, drew conclusions from this data and considered next steps for my own research, as well as what actions might be taken by GTHA transit agencies to address any shortcomings.

## Methodology

Basic accessibility, according to Metrolinx and the GTHA conventional transit agencies, requires a kneeling bus to be able to deploy its ramp onto a level concrete platform, which is of sufficient dimensions to allow a person in a wheelchair or scooter to disembark and turn around, and then continue along the sidewalk.

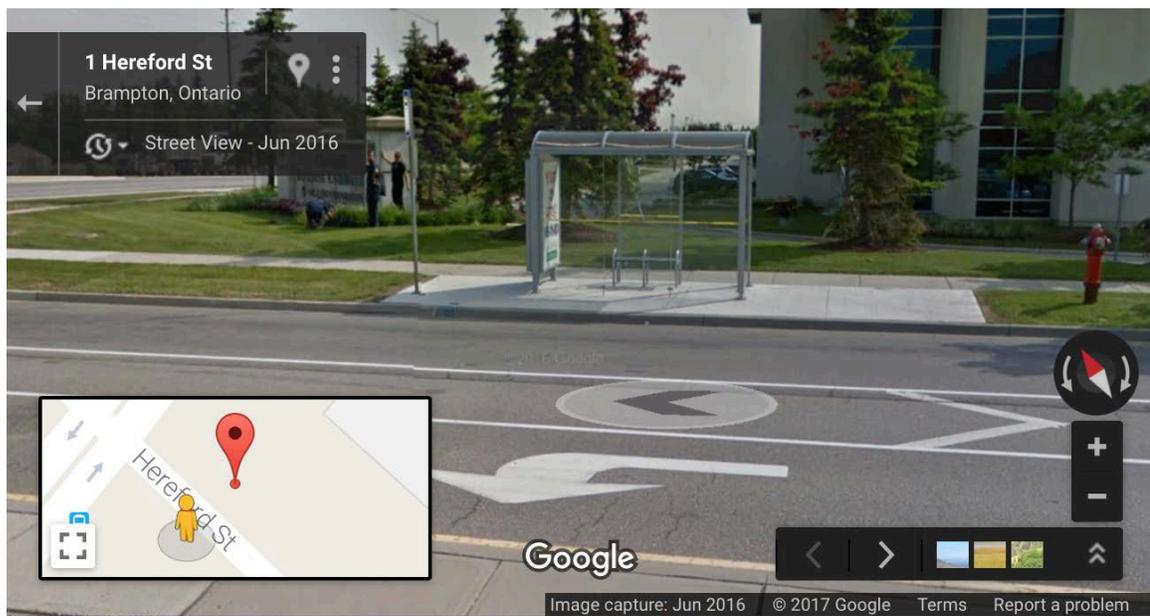


Figure 7: A Google Street View of a bus stop in Brampton, which exemplifies accessibility: a flat, large concrete pad connected to the sidewalk, and an accessible shelter, though the latter is not a requirement.

All data, namely which stops are accessible and which are inaccessible across the GTHA, were collected from an open-sourced data platform. I used Google's public database of transit stop information (GTFS), which is continually updated remotely by transit agencies to keep information current and accurate. In the case of three cities, Milton, Hamilton, and Toronto, the GTFS source data did not include an evaluation of the accessibility (basic or AODA-based) of each stop. In the case of Hamilton, I spent one day gathering data, in person, on as many stops as possible, to provide a small

sample to be used in the framework analysis. For the few unevaluated TTC stops, listed as “unknown” under the accessibility column, I used either personal confirmation or *Google Street View* to confirm basic accessibility.

Once I collected the data, I analyzed how the current GTHA transit maps and my own created maps, met or failed to meet the requirements laid out by the AODA, the UN-CRPD and Matthew Diller’s Civil Rights Model.

### Theoretical Frameworks

As discussed earlier, three major frameworks, provide focus and context for this research: the Accessibility for Ontarians with Disabilities Act (AODA),<sup>33</sup> the United Nations Convention on the Rights of Persons with Disabilities (UN CRPD),<sup>34</sup> and Diller’s Civil Rights Model.<sup>35</sup>

### **AODA**

The AODA, brought into law in 2005, created Ontario Regulation 191/11, also called the “Integrated Accessibility Standard”. Regulation 191 covers all manner of accessibility issues, but most relevant here is the Transportation Standard.<sup>36</sup> The Transportation Standard has multiple requirements of conventional, as well as paratransit, agencies; however, in order to answer my research questions, the requirements surrounding paratransit will not be covered. Paratransit services are highly specific,

---

33. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."

34. "Convention on the Rights of Persons with Disabilities and Optional Protocol." United Nations. December 13, 2006. <http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf>.

35. Diller, Matthew. "Judicial Backlash, the ADA, and the Civil Rights Model." *Berkeley Journal of Employment and Labor Law* 21, no. 1 (March 2000): 19-52.  
doi:<http://dx.doi.org/doi:10.15779/Z38H340>.

36. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS," Part IV.

including door-to-door or curb-to-curb service, which are not offered by conventional transit.

The Transportation Standard requires that any “conventional transportation service provider”, aka transit agency, outline procedures for estimating wait times for paratransit vehicles, and take “steps to reduce wait times for [paratransit services]”.<sup>37</sup> In conjunction with regulations requiring the transition to universally accessible vehicles as of 2011,<sup>38</sup> the conventional transit agencies are shifting their focus to a Family of Services (FoS) model. The FoS Model is designed to encourage paratransit riders, who are capable of boarding accessible vehicles, to make use of those services for all but the “First Mile [and] Last Mile”.

Section 47, on transit stops, also applied to my research. In it, transit agencies are required to ensure that:

[...] people with disabilities are able to board or deboard a transportation vehicle at the closest available safe location, as determined by the operator, that is not an official stop, if the official stop is not accessible and the safe location is along the same transit route.<sup>39</sup>

Section 58, Signage, has a glaring absence: all vehicles manufactured after 2013 are required to have signage that displays the vehicle’s route and current stops information.<sup>40</sup>

If a disabled passenger makes a last-minute stop request, the driver might not know the stop’s level of accessibility until it is too late. This situation could be unnecessarily frequent due to the lack of trip-planning information to guide the passenger.

---

37. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS," s. 42 (1).

38. Ibid., s. 39-40.

39. Ibid., s. 47 (1).

40. Ibid., s. 58.

## UN-CRPD

The CRPD brings countries together to focus on disabilities as a key issue, and develops increased accessibility measures across every possible aspect of life of a person with a disability. As stated in Article 1 of the CRPD: “the purpose of the Present Convention is to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their dignity.”<sup>41</sup>

Most relevant to this MRP are sections of the UN CRPD, including:

- “[The principle of] full and effective participation and inclusion in society”<sup>42</sup>
- That the nations adopting this Convention “[...] take all appropriate measures to eliminate discrimination on the basis of disability by any person, organization, or private enterprise”<sup>43</sup>
- “To undertake or promote research and development of universally designed goods, services, equipment and facilities [...] and to promote universal design in the development of standards and guidelines”<sup>44</sup>
- “To provide accessible information to persons with disabilities about mobility aids, devices, and assistive technologies, including new technologies, as well as other forms of assistance, support services, and facilities”<sup>45</sup>

Article 9 of the CRPD concerns general accessibility measures that signing nations must undertake. The measures focus specifically on “buildings, roads, [and] transportation”, and recommend that nations:

- “[...] promote other appropriate forms of assistance and support to persons with disabilities to ensure their access to information”<sup>46</sup>
- “[...] promote the design, development, production and distribution of accessible information and communications technologies and systems [...]”<sup>47</sup>

---

41. "Convention on the Rights of Persons with Disabilities," Article 1.

42. Ibid., Article 3(c).

43. Ibid., Article 4(e).

44. Ibid., Article 4(f).

45. Ibid., Article 4(h).

46. Ibid., Article 9, Section 2(f).

47. Ibid., Article 9, Section 2(h).

These sections, layered together, urge the adoption of equal access, to both information and transportation.

### **Diller's Civil Rights Model**

Diller states that “The civil rights model posits discrimination and resulting inequality as the central social issues that people with disabilities face. It establishes a framework of relationships in which employers and public institutions have a responsibility to facilitate the social integration of people with disabilities.”<sup>48</sup> This is vital when creating a transportation network that spans across several municipalities, and the signage and mapping that reflects it.

---

48. Diller, Matthew. "Judicial Backlash, the ADA, and the Civil Rights Model," 23.

## **Data Analysis**

### **Return to Wanda and Waldo**

In the introduction of this MRP, an example of two transit riders was presented, the siblings Wanda and Waldo. Waldo, who is wheelchair-bound, is dependent on transit agencies providing accessible stop information to plan an efficient journey. This accessibility information is not offered by the GTHA's transit agencies in a meaningful way that allows for easy access. This can make navigating around the GTHA very difficult for people with mobility impairments.

My research culminated in the creation of individual maps for the GTHA's transit agencies, by using publicly available GTFS stops data as offered by each the GTHA's nine transit agencies, as well as GO Transit (the regional transit provider within the GTHA). These data sets provided a picture of compliance, or non-compliance, with each of the three frameworks previously outlined: the AODA, the CRPD, and Diller's Civil Rights model. Using the maps as a visual representation of the data collected, the effort of each agency to make accessibility information available will be gauged according to the frameworks. Based on these evaluations, I will reflect on any further changes needed to improve the maps.

### **Creation of Map**

The main goal of this MRP was to produce a map that would be publicly available, and that would distinguish between accessible transit stops and inaccessible ones. My criteria for an accessible transit stop was simpler than what was required by the

AODA; instead of requiring specific dimensions and materials used, I evaluated the stops by sight when the individual transit company did not provide their own assessment.<sup>49</sup> My requirement for a stop to be accessible was defined as: a concrete pad large enough to permit the ramp from a bus or train (if required), to unfold completely, and allow the passenger to disembark with enough turning radius at the end of the ramp to navigate to the sidewalk in safety. In some cases, which will be outlined shortly, the concrete pad had been installed, however there was no connecting sidewalk. In such cases, I made the assumption that the stop was inaccessible, as travelling on gravel, uneven surfaces, or even dirt or grass is not optimal for wheelchair, scooter, or users of any mobility equipment, and can often lead to damage requiring costly repairs.

General Transit Feed Specification (GTFS)<sup>50</sup> data tables are tables by which Google Maps is able to locate, mark, and provide extra information for transit stops in cities around the world. The stops are organized and kept up to date by individual transit agencies. It should be noted that in these publicly available tables, there are multiple columns of information, including latitude, longitude, stop code and name of stop (often the intersection). The GTHA transit agencies do not fill in all the data columns that are offered, e.g. “parent station”; however, all, save Milton and Hamilton, have filled in the column marked “Wheelchair accessible”<sup>51</sup>. Although all of this raw data can be accessed by any member of the public, either through Google’s GTFS data website,<sup>52</sup> or through the transit agencies themselves, this data is not available in the stop information as

---

49. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."

50. "GTFS Static Overview." GTFS Static Overview | Static Transit | Google Developers. July 26, 2016. <https://developers.google.com/transit/gtfs/>.

51. "GTFS Static Overview."

52. Ibid.

presented on Google Maps. Each agency has the discretion to either display or hide columns of information. In the case of the GTHA, none of the agencies has chosen to make the data from the accessibility column visible to people using Google Maps.

There is also the issue of keeping all data current. The GTHA transit agencies are prompt at updating ‘priority’ information such as stop location – if, for example, construction causes a stop to be obstructed, and the agency must move its typical location. However, the agencies are far less invested in updating accessibility data, which is far simpler than having to change latitudes, longitudes, and stop names, in the event of construction. Accessibility data has 3 digits which represent different states: 1 indicates an accessible transit stop, 2 indicates an inaccessible transit stop, and 0 is a placeholder for ‘no information available’.<sup>53</sup> The Hamilton data shows no 1’s or 2’s in the ‘Accessibility’ column.<sup>54</sup> Despite contacting Hamilton repeatedly to ask if they had the accessibility information available in a separate database, I was unable to find out if anyone had audited their bus stops for accessibility.

For the creation of the Accessibility-Focused Maps (A-FMs) for this MRP, I downloaded the GTFS static data sets for all nine GTHA transit agencies, as well as for GO Transit. The data was translated by Microsoft Excel, to create a visually clear table of information, and this table was then uploaded to the mapping software for conversion into a map.

---

53. "GTFS Static Overview."

54. City of Hamilton. "Transit Service Areas." City of Hamilton Open & Accessible Data. February 26, 2015. <https://www.hamilton.ca/city-initiatives/strategies-actions/open-accessible-data>.

To present this information to the transit user and the general public, I created a customized series of Google Maps through my personal Google account, as Google Maps provides the greatest ease of universal access. The fundamentals of a custom Google Map were well suited to my purpose and personal coding capabilities: the Excel table of GTFS stops data for each agency was uploaded to the Google Maps Editor. Google Maps itself did all the coding; the end result were data points on the map, which I represented by a circular icon with the symbol of a bus inside, symbolizing a transit stop. I assigned a different colour to each agency, attempting to match the icon colour as closely as possible to their individual branded colours.

I used the 0, 1, and 2 from the 'Wheelchair Accessible' column to sort the data into stops that had unknown accessibility, were accessible, or were not accessible. I assigned the 0's (unknown accessibility), and 2's (not accessible) to the 'not accessible' category, and chose a grey shade for the location pin. This allowed the non-accessible stops to visually recede, while the accessible stops, in branded colours, showed clearly on the map.

While I wanted each transit agency to be represented by a single, easily distinguishable colour, this was found to be impossible: the nine agencies would have required orange or yellow shades to be used, which have minimal to no contrast against the map's grey background. This would have led to an unacceptable barrier for people with visual impairments. As such, I re-used one or two colours, under the strict principle that they should be kept to opposite ends of the map, so as to reduce confusion.

The efficiency of Google Maps in its customized format is clear from the legend attached to the A-FM: each agency is listed separately, and the user can choose to have each agency visible or hidden. Delving deeper into the detail of the map's legend, the user can also choose to erase the inaccessible stops from view entirely, by selecting only the accessible stops for an individual agency, or for all of the agencies. This flexibility should provide a greater range of support for users of the map, by reducing the 'noise' produced by data that they don't require for their particular trip.

Unfortunately, Google's personalized map also contains a critical weakness: the map itself allows only ten layers to be displayed at once, and only 2000 data points per layer. This meant that not all agencies could be presented on a master map, as four had well over 2000 stops, and therefore required their own maps. For the purposes of this map I can only display the transit stop locations and accessibility details provided by the agencies. I was unable to include routes within the transit stop layers, as the complexity of the data for the routes was beyond the capabilities of My Google Maps. Google API and JSON, among other softwares that require manual coding to produce the information, have the ability to have two datasets on one layer, or to have more layers entirely.

After I entered all of this data into Google Maps, and produced the personalized render according to accessibility criteria, I analyzed the data to look for trends that emerged. Some of the trends were visible on the zoomed-out, full maps, while other trends only became evident upon zooming in on specific areas. The areas I looked at were sites to which a person with a mobility impairment might travel, assuming the stops

are accessible: these included public parks, clubs, business districts, and routes along major highways.

#### Analysis per City

##### **Hamilton: 4.5%\* Accessible**

Accessible Stops: 110

Unknown: 2338

Total Stops: 2448

In order to see for myself whether Hamilton was truly inaccessible, or had merely put aside entering the proper data into its GTFS table, I drove to Hamilton and did a complete survey along several of the main north/south routes. To my surprise and vexation as an accessibility advocate, most of the bus stops Hamilton offered were, in fact, completely accessible, though this information was not encoded into their GTFS data.

Of the almost 500 stops I surveyed that day, only a handful were inaccessible. Even the stops that had been very recently built to accommodate the expansion of the city limits were either already connected to the sidewalks, to comply with AODA standards,<sup>55</sup> or in the active process of being connected.

---

55. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."



Figure 8: Aerial photograph of bus stop at 1394 Upper Wellington in Hamilton. Though there is a shelter (hidden by the icon), the bus deposits passengers onto gravel. It is also important to note that the driveways to the right and left of the bus stop lead to parking lots for two churches. Neither driveway, however, is sufficiently paved or level for the driver to exercise the right to disembark a passenger with a mobility aid (at the passenger's request).



Figure 9: Photo taken by the Google Car of the same bus stop. Note one of the churches in the background, as well as the gravel surface which has remained there between 2016 (when Figure 8 was photographed), and 2017 (when Figure 7 was photographed).

**Brampton: 63% Accessible**

Accessible Stops: 1794  
Non-Accessible Stops: 81  
Unknown: 956  
Total: 2831

The problem in Hamilton is a lack of information; however, in Brampton the problem is physically inaccessible bus stops. To a lesser degree than Hamilton, Brampton also had neglected to fill in accessibility information. Though 1794 of 2831 stops are accessible (63%), connected appropriately to sidewalks for navigation, the remaining 1,037 bus stops are located at the base of a small, grassy/muddy berm, which any disembarking passenger must then ascend to reach the sidewalk (if any sidewalk is offered). It would be physically impossible, in that situation, for a bus ramp to be deployed, much less for the person with a mobility impairment to disembark safely. If they disembarked successfully, they would have to travel along the paved or gravel shoulder of the road for a long distance until finally able to connect to the sidewalk at an intersection.

Brampton's data was divided, initially, into two categories: '1/accessible' and '0/unknown'. In an effort to get a better sense of whether the 'unknown' meant completely non-accessible stops, I visually referenced Google Street View and Google Satellite View for 330 stops that had been labelled 'unknown'. I was able to find 81 truly non-accessible stops in this sample, translating to roughly 24.5%. Their inaccessibility was due to the geography and urban planning as outlined above. Projecting this ratio forward, to address the remaining 956 'unknown' stops, approximately 235 more stops would be truly non-accessible.

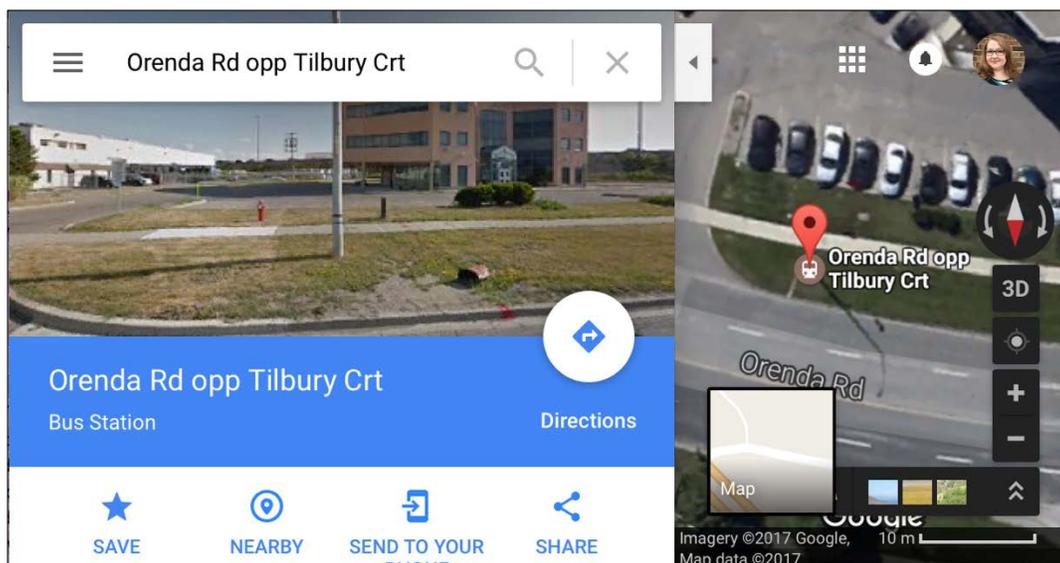


Figure 10: Example of inaccessible bus stop in Brampton, located at Orenda Road opposite Tilbury Court. Anyone exiting the bus must walk across a stretch of grass to reach the sidewalk. Following the AODA's requirements, the bus would not be allowed to deploy its ramp at this location.<sup>56</sup> The bus driver would have to advance to the entrance to the parking lot seen to the left, so that the ramp could be deployed for the rider to disembark. This is a dangerous maneuver, as it would require the bus to remain parked, in a 'protective stance', until the rider had safely reached the sidewalk.



Figure 11: A second type of inaccessible stop in Brampton. In this case, there is no sidewalk available whatsoever: instead, the only area for any disembarking rider is the gravel shoulder.

56. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."

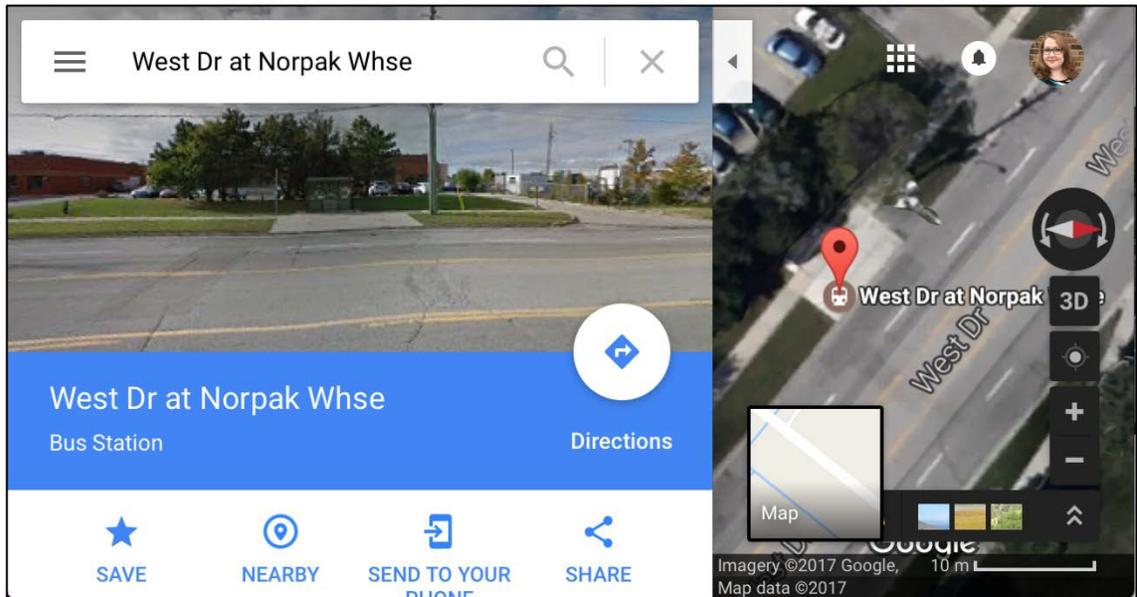


Figure 12: an accessible stop in Brampton. Though the sidewalk is set far back from the curb, a common design feature of this city, the transit agency has placed a wide concrete pad that reaches from the road to the sidewalk.

### **Oakville: 55% Accessible**

Accessible Stops: 622

Non-Accessible Stops: 425

Unknown: 85

Total: 1132

45% of the transit stops in Oakville are not accessible to people with mobility impairments; in the 45% is included the 85 ‘Unknown’ stops, which are presumed to be inaccessible. In the case of Oakville, large sections of entire routes are inaccessible, e.g. Linbrook Rd., Cornwall Rd., Royal Windsor Dr., which largely run southwest to northeast, and Burloak Dr., Colonel William Pkwy, and Valleyridge Dr., all on the western edges of Oakville’s transit system, which run northwest to southeast. The inaccessible stops are not interspersed between accessible stops; the above routes are almost completely inaccessible to people with mobility impairments.

Some of the inaccessible stops are inaccessible for logical reasons - the service road beside the QEW allows for disembarkation on the south side of the service road, but there are no sidewalks or facilities on the north side, as there is only highway. Regardless of individual routes, when the map of Oakville Transit is zoomed out to encompass its entire region, two trends emerge: a far greater percentage of transit stops below Highway 401, and stops near to ecological regions such as provincial parks and Sixteen Mile Creek, are inaccessible. Two of the three major golf courses in Oakville, Glen Abbey Golf Club and Oakville Golf Club, are accessible, while Deerfield Golf Course is not; this is important, as often large social functions such as weddings are held in such venues. Providing invitees with as many transportation options as possible may make the difference between accepting the invitation or declining.

**Milton: 0%\* Accessible**

Unknown: 352

Unfortunately, at the time of this research's publication, there is no valid information available regarding the accessibility of stops in Milton's GTFS data. Instead, like Hamilton, Milton has entered '0', or 'Unknown'. However, a random sampling of 10 transit stops, divided between commercial and residential areas, shows an urban planning layout similar to Brampton, with sidewalks offset a fair distance from the road curb.

In most commercial areas where there is a gap between street and sidewalk, a cement base has been installed to allow for full sidewalk access; in some cases, the base has been put into place with no sidewalk installed, thus rendering it inaccessible for this

research. In many residential areas no base has been installed, meaning the stop itself is inaccessible.

Milton's primary challenge for the near future will be expanding its entire transit base, to accommodate a population and housing boom that is currently pushing the city's boundaries, schools, and transit system almost to the breaking point.<sup>57</sup> Currently, Milton's transit system is also completely geographically isolated from its neighbours, including Oakville and Mississauga. Though connection to those transit agencies is unlikely to occur in the near future, all three agencies should plan for integration in that future eventuality.

#### **Durham: 72% Accessible**

Accessible Stops: 1931

Non-Accessible Stops: 742

Total Stops: 2,673

Durham is a region with a very split personality: as with Oakville, a surprisingly high percentage of transit stops between Highway 401 and Lake Ontario are inaccessible, especially routes that are north-south. In that region are multiple parks, preserves, as well as lakeshore parks, which are thus inaccessible to people with mobility impairments who do not possess private transportation. A route forming a U with the 401, with the GM Oshawa Car Assembly factory has 12 inaccessible stops, and only 8 accessible stops; no stops are closer than the very outside of the huge parking lot for the factory. Although it is possible that GM offers a shuttle service, it would be physically difficult for a person

---

57. Grewal, S. "Milton - a snapshot of a region struggling with growth." Thestar.com. December 21, 2015. <https://www.thestar.com/news/gta/2015/12/21/milton-a-snapshot-of-a-region-struggling-with-growth.html>.

with a mobility aid to safely navigate their way to the factory. The Pickering Nuclear Power Plant has a similar situation, where 5 of 17 transit stops leading to the power station are inaccessible; furthermore, none of the accessible stops comes nearer than an ecological park 1 km away from the entrance to the power station.

There is a long stretch of transit, run by Durham, which runs from its main area of operations to Prince Albert/Highland Beach on Lake Scugog, Uxbridge, and one stop at the Mill Run Golf Club. In these instances, the long-distance from the 407 to Highland Beach is inaccessible until the town is reached; there, approximately half of the stops are accessible. The same is true between Highland Beach and Uxbridge.

2 distinct clusters of 'Unknown' along the western side of transit coverage: Harvester Rd. near Appleby, and Dundas St. from Hwy 5 to the 407. Again, parks, and Millcroft Golf Club left seemingly inaccessible; however, these stops may have been planned and built, and simply not kept updated in the GTFS database.

### **Burlington: 100% Accessible**

Accessible Stops: 664

Non-Accessible Stops: 0

Total Stops: 664

All of Burlington's stops are accessible. The routes run from the lakeshore up to the 407, which currently demarks the northern boundary for Burlington's municipality jurisdiction.

Burlington is a great example of a small agency that made proper bus stops a priority in their planning, i.e. ensuring accessibility for both those with mobility aids and

those without. People without mobility aids will also appreciate the large, even concrete pads during inclement weather, and easy access to sidewalks.

**GO Transit Stations: 58% Accessible – Bus Stops 36% Accessible**

GO Stations: 136

Accessible Bus Stops: 482

Non-Accessible Bus Stops: 839

Total Stops: 1457

57.6% of stations are not accessible; this could be because there was inadequate updating. GO train stations and bus terminal stations are accessible, though for reasons unknown they have been marked as '0' or 'Unknown' in the Wheelchair\_Boarding column. Of the several sampled, the stations have easy access to the station proper in the form of accessible stops being placed deliberately at the entrance. This prevents the rider from having to cross through busy parking lots with bustling cars and people. The accessible stop at the entrance to the stations/depots can, and often are, used in conjunction with local transit, to ensure equal coverage.

A problem similar to Durham exists with GO bus routes: only the end points of at least eight major transit lines are listed as accessible. This presents a large disadvantage for people with mobility impairments: they are incapable of settling in smaller towns, where GO stops exist but are inaccessible. This may restrict their presence to the end points of the routes, such as Barrie, Guelph, St. Catharines, and Brantford.

**Mississauga: 96% Accessible**

Accessible Stops: 4200

Unknown: 171

Total Stops: 4371

Mississauga Transit, or MiWay, boasts the highest accessibility rate for any large transit agency, of 96.1%. Of the remaining 171 stops, they are classified as unknown and are presumed to be non-accessible.

**York Transit: 66% Accessible**

Accessible Stops: 3234

Non-Accessible Stops: 1697

Unknown: 0

Total Stops: 4931

York Transit, in contrast to Mississauga, has the lowest rate of accessible stops, at 65.6%. The inaccessible stops for York, in the densest area of coverage, are scattered fairly evenly throughout. York also suffers from the same issues as Durham and GO Transit: in the case of its long-distance routes, the majority of stops between the region's center and the final destination are inaccessible. This applies to routes to Mt. Albert and Sutton, Ontario. The route from Keswick to Sutton poses a particular problem: there are many small communities which York Transit stops at along the way, between these two towns, but due to inaccessibility, people with mobility impairments may not be able to choose to live in these smaller towns.

Beyond Sutton, ON, York Transit continues along Lake Simcoe to the town of Port Bolster (1 stop), and Marina Estates (5 stops). None of these stops is accessible.

**TTC: 74% Accessible**

Accessible Stops: 7816

Non-Accessible Stops: 2744

Unknown: 10

Total Stops: 10,570

In the case of the TTC, 74% of its stops are accessible. Many of the inaccessible stops cannot be converted into accessible stops, without extensive and major structural changes to downtown streets, which are not in future construction projections for the agency. These include streetcar lines along Lakeshore Queen Street, King Street, Dundas Street, and College Street. Although the city has procured low rise streetcars to make overall accessibility better, these particular streetcar lines are placed in the centre of the road, where size restrictions may prevent a person in a wheelchair from safely disembarking from the vehicle turning and then crossing half the street to the main sidewalk. There are also regions within these recurrent lines which are not built at the right height to accommodate these arise streetcars; in these cases, embarking or disembarking at those stops would be impossible for people with mobility aids.

### GTHA Transit Through the Lens of the AODA

The AODA, brought into law in 2005, created Ontario regulation 191/11, also called the "Integrated Accessibility Standard".

The Family of Services (FoS) model, the response to the AODA's requirements, is a plan for future transit, that involves updating existing fleet vehicles to be universally accessible. As of 2013, the transit agencies were also required to apply universal accessibility standards to all future purchases of fleet vehicles, and integrates accessibility into any plans for the built environment around transit structures.

According to the AODA, and in conjunction with Ontario's stated intention to be universally accessible by 2025, transit agencies across the province have been obligated to address any deficiencies in their systems that would cause overall inaccessibility of their services. Based on legislation as outlined in section 58 on signage,<sup>58</sup> there is no legislative requirement that an agency indicate the accessibility of transit stops within its region, be that indication online or through conventional paper maps. Often the paper maps or whole system maps are unable to display individual stops, such as is the case in Toronto, with approximately 12,000 stops. This, however, can be addressed by making accessibility information available through online mapping sources, such as Google maps or an agency's individual trip planning software.

There is no requirement for transit agencies to keep accessibility of transit stops up-to-date in GTFS tables that are publicly available.<sup>59</sup> Whether it is an intentional omission, caused by budgetary concerns, or ignorance of the fact that their accessibility

---

58. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."

59. Ibid.

information is outdated in their GTFS tables, multiple agencies in GTHA have failed to keep accessibility information up-to-date. These cities include Hamilton and Milton. Oakville, Brampton, Mississauga, and the TTC all have some stops that are labelled as unknown in terms of accessibility. A sampling of Brampton's unknown stops revealed that the data had not been updated in some time, as many of the stations are now fully accessible to people with mobility aids. In the case of Hamilton, the majority of stops that I personally sampled were accessible, leaving only a small number truly non-accessible to people with mobility impairments.

Worthy of mention and praise are two cities: Burlington, whose 664 transit stops are all marked as accessible in GTFS data, and Mississauga which boasts only 3.9% non-accessible stops across its region.

The worst cities for accessibility were Oakville at 45% non-accessible stops, Brampton, with 37% non-accessible stops, York transit at 34.4% non-accessible stops, Durham at 27.8% non-accessible stops and the TTC with 26% non-accessible stops.

It is important to understand that the AODA, as it was written, presented a series of minimum guidelines for all organizations to meet over a period of years, culminating in "universal accessibility" by 2025.<sup>60</sup> This does not mean that best practices were written into the law; rather, those best practices were watered down by various interest groups to create the minimum that exists in the present legislation.

As my research evaluated the transit agencies of the GTHA according to this legislation as it exists, including its limitations, the transit agencies all meet the general

---

60. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS."

requirements of the legislation. For example, in Brampton, where many transit stops are inaccessible, section 47 of the integrated accessibility standard applies.<sup>61</sup> This means that instead of disembarking the passenger at the inaccessible stop, the driver can compromise by dropping the passenger off at a location near the stop, which is also a safe location. Section 47 can be applied to any agency within the GTHA;<sup>62</sup> unfortunately, there has been no effort to publicize this option by any of the agencies, leaving the mobility – impaired rider to either discover their rights in section 47 on their own, or more likely, to be forced to choose an earlier or later stop, either of which would require additional travel time outside of transit.

It is worth questioning whether this seeming inconvenience, driven by ignorance of section 47, is not the main reason for paratransit riders' reluctance to switch over to the family of services.

In section 47, there is no explicit or implicit requirement to upgrade transit stops to insure universal accessibility.<sup>63</sup> Instead, the stopgap measure of dropping a passenger off at the nearest "safe" location, appears to lift pressure from transit agencies to upgrade their built environments. Although I reviewed the entire integrated accessibility standards, I was unable to find a requirement or schedule for updating the built environment of transit stops. Instead, the responsibility of deciding whether to upgrade or leave as – is current transit stops has been left up to each individual municipality.

---

61. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS," section 47.

62. Ibid.

63. Ibid.

The signage requirements, as outlined in section 58,<sup>64</sup> omit the fact that vehicle's manufactured after 2013 are only required to have signage that displays the vehicles route and current stop information. However, the accessibility of the upcoming stop is not required to be displayed according to the AODA. This lack of public, real-time, accessibility information could negatively impact passengers who request stops that they do not know are not accessible. This increases time spent at each stop, resulting in a waste of time for both passengers with mobility impairments, the driver, and all other passengers.

The Ontario Human Rights Commission (OHRC), a non-partisan commission run by the government to handle legislative complaints such as Human Rights Code violations, began to track the shortcomings of the AODA's Transportation Standard in 2004.<sup>65</sup> On March 31<sup>st</sup>, they issued a warning of shortcomings to the "consultations to strengthen the ODA", and offered "a number of recommendations to make the legislation more effective."<sup>66</sup> Unfortunately, these recommendations were not implemented; this led to a second scathing report in 2007 in a more forceful attempt to have vital changes made to the Transportation Standard.<sup>67</sup> Specifically:

The Commission has grave concerns with significant aspects of the *Transportation Standard*. In a number of areas, the standard falls far short of human rights standards, not only failing to make progress towards equality for persons with disabilities, but regressing on gains previously made. The Commission urges the Committee to significantly revise the

---

64. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS," section 58.

65. "Submission of the Ontario Human Rights Commission to the Transportation Standards Review Committee regarding the Initial Proposed Transportation Accessibility Standard." Ontario Human Rights Commission. August 2007. <http://www.ohrc.on.ca/en/submission-ontario-human-rights-commission-transportation-standards-review-committee-regarding#fn3>.

66. Ibid.

67. Ibid.

*Transportation Standard* in order to bring it into alignment with human rights standards and the purposes of the AODA. The Commission will take further steps pursuant to its powers under the Ontario *Human Rights Code* [...] should the standard not be significantly strengthened prior to adoption into regulation.<sup>68</sup>

What the OHMC was pointing out were inadequacies in the AODA that were, and remain, not only egregious, but go against the CRPD (see CRPD Framework Analysis).

The only method to date of forcing change has been through various lawsuits:

Persons with disabilities have a human right to adequate, dignified public transportation services on an equal basis. Section 1 of the Code guarantees the right to equal treatment with respect to services, including transportation, without discrimination on the basis of disability. A failure to provide equal access to transportation services is a violation of the Code and can be the subject of a human rights complaint. In two recent human rights complaints, the Human Rights Tribunal of Ontario (“HRTO”) determined that the failure of the Toronto Transit Commission to provide audible announcements of stops on its subway system, and on streetcars and busses, violated the human rights of persons with visual impairments.<sup>69</sup>

These lawsuits included:

In *Ontario Human Rights Commission v. Toronto Transit Commission*, 2005 HRTO 36, (September 29, 2005), the HRTO ruled that the TTC had a duty to accommodate visually impaired riders on its subway system by announcing stops. In the very recent *Lepofsky v. Toronto Transit Commission*, 2007 HRTO 23, (July 26, 2007),<sup>[70]</sup> a similar ruling was made with respect to busses and streetcars.<sup>71</sup>

Unfortunately, even these first lawsuits did not solve the problem of stop announcements entirely: after committing in 2008 to installing such devices by the end of the year, three transit agencies (Hamilton, Thunder Bay, and Sudbury), had not met their commitments

---

68. "Submission of the Ontario Human Rights Commission."

69. Ibid.

70. Kalinowski, T. "Blind lawyer pulls out the stops in TTC fight." Thestar.com. April 27, 2007. [https://www.thestar.com/news/2007/04/27/blind\\_lawyer\\_pulls\\_out\\_the\\_stops\\_in\\_ttc\\_fight.html](https://www.thestar.com/news/2007/04/27/blind_lawyer_pulls_out_the_stops_in_ttc_fight.html).

71. "Submission of the Ontario Human Rights Commission."

to the OHRC.<sup>72</sup> The OHRC thus took the three transit agencies before the Human Rights Tribunal of Ontario, asking for full installation of automated stop calls within 30 days of the rendered decision.<sup>73</sup>

### CRPD Framework Analysis

The United Nations' Convention for the Rights of People with Disabilities (CRPD)<sup>74</sup>, is fundamentally very different from the AODA. Instead of dealing in the minutiae of legislative requirements, it makes broad-stroke declarations that cover every conceivable aspect of a person's life and life experience. For my research, I only have to concentrate on the transportation and information sections.

Article 9 of the CRPD concerns general accessibility measures that signing nations must undertake, and bears repeating here. The measures focus specifically on "buildings, roads, [and] transportation", and recommend that nations:

- "[...] promote other appropriate forms of assistance and support to persons with disabilities to ensure their access to information"<sup>75</sup>
- "[...] promote the design, development, production and distribution of accessible information and communications technologies and systems [...]"<sup>76</sup>

The concept of promoting accessibility is a fundamental tenet of the CRPD: by keeping the wording vague, each signatory nation is held to an active role. Instead of an explicit bar being set for specific issues, such as the dimensions of the concrete pad for transit

---

72. "Appendix B: Stop announcement practices and commitments." Appendix B: Stop announcement practices and commitments. March 2008. <http://www.ohrc.on.ca/en/next-stop-accessibility-report-public-transit-stop-announcements-ontario/appendix-b-stop-announcement-practices-and-commitments>.

73. "Taking transit to the Tribunal." Taking transit to the Tribunal. July 2009. <http://www.ohrc.on.ca/en/annual-report-2009-2010-educate-empower-act/taking-transit-tribunal>.

74. "Convention on the Rights of Persons with Disabilities," Article 9, Section 2(f).

75. Ibid., Article 9, Section 2(f).

76. Ibid., Article 9, Section 2(h).

stops, the goal assigned to nations who have signed on to, and ratified (as Canada has), the CRPD is to increase accessibility continually. The result is that, as soon as a self-imposed goal for an accessibility issue is reached, the goalpost is moved again, keeping all participants in a state of constant improvement and innovation.

In these respects, none of the GTHA agencies, to date, have displayed a proactive role in promoting accessibility within their organizations. The CRPD suggests that it be nations, or at least organizations, who must take the initiative. Instead, as a solid example of the very reverse, David Lepofsky, a person with a disability and a disability rights activist, was forced to sue the TTC to have clear visual displays and audio announcements installed on all buses, streetcars, and subways.<sup>77</sup> Once the TTC lost the case, it quickly complied, and now all passengers can enjoy clearly audible and visible next-stop announcements. But the fact remains that the transit agency had to be forced by court order to implement low-cost accessibility improvements; this stands in direct conflict to the principles of the CRPD that initiative and constant improvement be the way by which accessibility improvements are incorporated into society.

#### Diller Framework Analysis

“The civil rights model posits discrimination and resulting inequality as the central social issues that people with disabilities face. It establishes a framework of relationships in which employers and public institutions have a responsibility to facilitate the social integration of people with disabilities.”<sup>78</sup>

---

77. Kalinowski, T. "Blind lawyer pulls out the stops in TTC fight."

78. Diller, Matthew. "Judicial Backlash, the ADA, and the Civil Rights Model," 23.

Instead of merely urging the bar to be set higher after each single accessibility accomplishment (in all areas of life), as in the CRPD, Diller focuses on the explicit responsibility that the creators of a society, both public government and private sector, must take on to make that society accessible and integrating for people from all walks of life.

This trenchant moral responsibility, one could argue duty, of governments and businesses to “facilitate [...] social integration of people with disabilities”<sup>79</sup> appears to be a concept utterly alien to most, but not all, of the transit agencies within the GTHA. Whether the issue be Hamilton’s indefinite postponement of an inventory of accessible bus stops, or the TTC’s resistance to installing vocal/audible stop announcements on transit vehicles before being sued into compliance, these agencies have so far shown themselves reluctant to facilitate Diller’s social integration.

---

79. Diller, Matthew. "Judicial Backlash, the ADA, and the Civil Rights Model," 23.

## Conclusion

After reviewing the results of my work, I will directly address how the map answers my three research questions:

- Is the current (broader GTA-wide) system accessible through the lens of AODA, the CRPD, and the Diller's Civil Rights Model? (i.e. a three-part evaluation)
- Based on this three-part evaluation, what changes need to be made?
- What changes need to be made in order to satisfy the CRPD? Would these changes exceed (or be different than) the changes that need to be made to ensure AODA compliance?

I will also include recommendations such as making the map publicly available, and promoting its existence to increase awareness for accessible transit. The takeaway is that transit should always aim higher than the minimum, be it legislative or moral.

The results of my research proved highly illuminating. While the agencies of the GTHA comply to all the explicit requirements of the AODA, the AODA itself falls short of meeting the goalposts set by the CRPD. All GTHA transit agencies thus fall vastly short of Diller's civil rights model, which is a pure and distilled model from which the CRPD grows. Any initiatives displayed by the transit agencies that, currently, go above and beyond the AODA, are often lauded as 'best practices', when in reality they should be treated as the next step in the constant evolution of accessibility. The built environment around transit is the most visible aspect of accessibility to the public, and is used by people with and without mobility aids: to that end, any shortcomings or

innovations are prominently on display. It is this prominence in the public's eye that can severely affect the reputation of a transit agency: witness the TTC and its struggle to upgrade its subway system, which, 8 years from the 'culmination' of the AODA's objective, is still largely inaccessible. Such a public struggle, rife with complaints of inadequate funding or difficulties in building accommodations,<sup>80 81</sup> need not exist. Three transit organizations in the GTHA deserve special mention for coming closest to meeting the CRPD's requirements of promoting accessibility through transit, or of constantly pushing back the goalposts for accessibility. Burlington, though possessing only 664 stops (the second smallest agency in the group), has ensured and reported that all of its transit stops are accessible: this allows any traveler, regardless of physical ability, to plan their trip without having to examine the minutiae of the stop closest to their departure or destination. Mississauga, the third largest transit agency, with 4371 stops, proved that aiming for 100% accessible stops did not need to remain the domain of small transit agencies. While small agencies face a shorter backlog of renovations to bring all stops up to accessible standards, Mississauga is already at 96.1% accessibility, with the remaining stops listed as unknown; clearly, incorporating accessibility as a priority during renovations and for new stops has not caused any severe impact to Mississauga's

---

80. "Solution to TTC's funding woes isn't higher fares: Editorial." Solution to TTC's funding woes isn't higher fares: Editorial. November 21, 2016. <https://www.thestar.com/opinion/editorials/2016/11/21/solution-to-ttcs-fuding-woes-isnt-higher-fares-editorial.html>.

81. Spurr, B. "Advocacy group encourages TTC riders to call for more funding, better service." Advocacy group encourages TTC riders to call for more funding, better service. January 30, 2017. <https://www.thestar.com/news/gta/2017/01/30/advocacy-group-encourages-ttc-riders-to-call-for-more-funding-better-service.html>.

budget.<sup>82</sup> GO Transit, despite having fewer than 42.4% of their stations as accessible, have released plans that set a priority on making their transit stops accessible for anyone.<sup>83</sup>

Unfortunately, although Burlington, Mississauga, and GO Transit all have, or are in the process of, aggressively enhancing accessibility in the built environment, the CRPD's policies, and OHRC's pleas, regarding the distribution of accessibility information have not been addressed. While Metrolinx does include the option to select an accessible route online, via its Triplinx trip-planning software, the remaining transit agencies do not include accessible stop information in their personal trip-planning software. They also do not include accessible stop information on paper maps, or online PDFs that can be printed off for the same purpose. The greatest attempt at meeting the CRPD's goal of promoting information about accessible travel can be found on the TTC's limited map legend. There, the TTC restricts identifying accessible transit stops to the subway system only, and in a manner that is difficult, if not impossible, for people with vision impairments to discern.

The changes that need to be made to the existing transit agencies are not necessarily expensive, or even difficult to accomplish. Most of the data regarding the accessibility of transit stops has already been gathered by the various transit agencies (with the exception of Milton and Hamilton). It is then a matter for the software

---

82. "Mississauga MiWay 2017-2018 Business Plan & 2016 Budget." 2016 MiWay Business Plan. 2016. <http://www7.mississauga.ca/eCity/Budget/img/serviceareas/business-plans/2016-miway-summary.pdf>.

83. "Discussion Paper for the Next Regional Transportation Plan." Metrolinx the Regional Transportation Plan Review. August 2016. [http://www.metrolinx.com/en/regionalplanning/rtp/RTP\\_Discussion\\_Paper\\_EN.pdf](http://www.metrolinx.com/en/regionalplanning/rtp/RTP_Discussion_Paper_EN.pdf).

encoders, who maintain the trip-planning software platforms used by the GTHA agencies, to make active use of the data that is already provided in every GTFS package. Each agency may choose to display accessibility in a different manner: I chose to colour-code stops based on accessibility, but other agencies may prefer to use a filter reminiscent of RATP's accessibility table.<sup>84</sup> By clicking on 'accessible stop', any non-accessible stops would disappear from view entirely. Once these minor changes are accomplished, the goal of each and every agency should be to promote, as widely and as loudly as possible, the new availability of the accessible stops information. Included in those information drives should be the AODA Transportation Standard's requirement that the bus driver let a person with a mobility aid off between stops, at a safe and accessible location. This will increase public awareness of how many stops truly aren't accessible in their cities, and may improve transit agencies' in-house culture of accessibility.

### **Next Steps**

My own personal next steps will hopefully be taken in conjunction with the agencies whose accessibility I have critiqued in this research.

My first goal is to find an alternate system of map display, that would allow me to combine all ten agencies onto one map, regardless of the number of agencies or stops covered by each agency. Several are commonly used by the transit agencies, such as Google AIS, which involves coding and translating GTFS data into a program that runs through Google Maps to provide the appropriate locations, along with any other information that the agency chooses to tag. This would necessarily include accessibility

---

84. "Plan Interactif des transports en Ile-de-France."

information about each stop, which would be colour-coded as with the maps that I have made for this MRP. Google AIS would allow for one map, embedded in any website. Google AIS also has the advantage that routes can be easily drawn and updated based on the source GTFS data; this software can be used in conjunction with directional software such as Triplinx, or other agencies' proprietary directional software.

For visual representations on printed maps, the information from the GTFS data is taken, encoded, and manipulated through GeoJSON for geographical structures. This is especially useful when maps are not drawn to exact scale, but are rotated, stretched, or otherwise made more symbolic. The purpose may be aesthetic, but the purpose can also be to ensure that all stops are displayed on a standard-sized piece of paper or map; York Region's transit system, which stretches far to the north of its main operating zone, would be a likely candidate for map resizing. GO Transit uses a more symbolic map to represent their rail lines, which stretch far to the north, as well as around to Niagara during the summer.



Figure 13: A copy of GO Transit's train route map, which is clearly compressed vertically to minimize Lake Ontario, and provide enough room to display all the routes, including the seasonal Niagara Route (source: <http://www.gotransit.com/timetables/en/schedules/maps.aspx>)

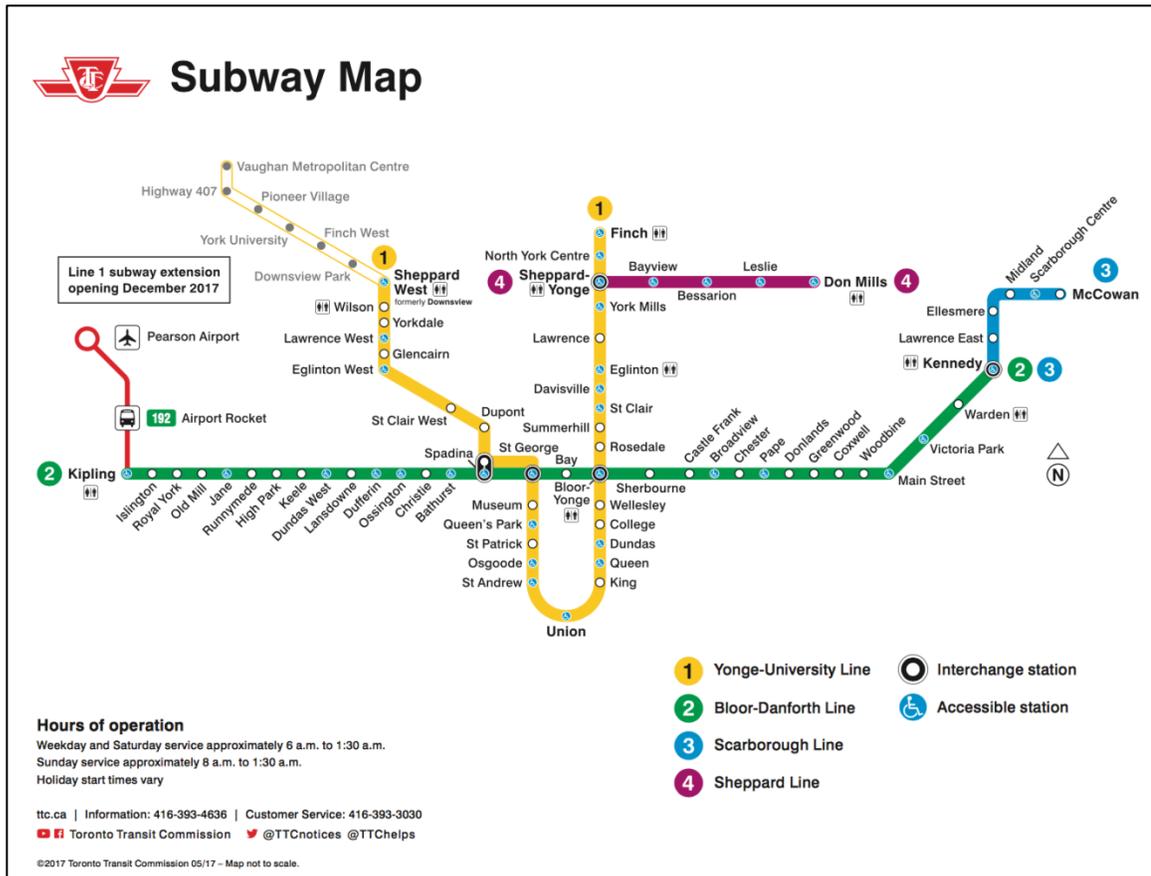


Figure 14: TTC Subway system map, clearly represented in a symbolic, and not geographically accurate, manner. Note the microscopic blue dots inside some of the stations: these are the indicators that a particular subway station is accessible. (source: [https://www.ttc.ca/PDF/Maps/Subway\\_Map.pdf](https://www.ttc.ca/PDF/Maps/Subway_Map.pdf))

I intend to reach out to each agency to provide them with the information that I have gathered, to emphasize how easy it is for them to include (legible) accessibility information for transit stops in their online maps. I cannot lay claim to any skills in coding, thus why I settled on “My Maps from Google Maps for my MRP research; however, each agency employs one or more people to maintain both the online and offline maps. As in the case of most agencies, a full or partial accounting of the accessibility of their transit stops has already been accomplished, and I will advocate

strongly, with each, to finish the accessibility assessments and upload the status of their transit stops into their online maps.

## References/Bibliography

- "2011 TTC Operating Statistics." TTC 2011. 2012.  
[https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2011.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2011.jsp).
- "2012 TTC Operating Statistics." TTC 2012. 2013.  
[https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2012.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2012.jsp).
- "2013 TTC Operating Statistics." TTC 2013. 2014.  
[https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2013.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2013.jsp).
- "2040 Transportation Policy Plan." Metropolitan Council - 2040 Transportation Policy Plan (TPP). [https://metro council.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan-\(1\)/The-Adopted-2040-TPP-\(1\).aspx](https://metro council.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan-(1)/The-Adopted-2040-TPP-(1).aspx).
- "About New York City Transit." [http://web.mta.info/nyct/facts/about\\_us.htm](http://web.mta.info/nyct/facts/about_us.htm).
- "About the TTC: Operating Statistics 2014: Section One." Section One. 2015.  
[https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2014/Section\\_One.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2014/Section_One.jsp).
- "About the TTC: Operating Statistics 2015: Section One." Section One. April 19, 2016.  
[https://www.ttc.ca/About\\_the\\_TTC/Operating\\_Statistics/2015/Section\\_One.jsp](https://www.ttc.ca/About_the_TTC/Operating_Statistics/2015/Section_One.jsp).
- "Accessibility | WMATA." Accessibility | WMATA.  
<https://www.wmata.com/service/accessibility/>.
- "Appendix B: Stop announcement practices and commitments." Appendix B: Stop announcement practices and commitments. March 2008.  
<http://www.ohrc.on.ca/en/next-stop-accessibility-report-public-transit-stop-announcements-ontario/appendix-b-stop-announcement-practices-and-commitments>.
- "Discussion Paper for the Next Regional Transportation Plan." Metrolinx the Regional Transportation Plan Review. August 2016.  
[http://www.metrolinx.com/en/regionalplanning/rtp/RTP\\_Discussion\\_Paper\\_EN.pdf](http://www.metrolinx.com/en/regionalplanning/rtp/RTP_Discussion_Paper_EN.pdf).
- "GTFS Static Overview." GTFS Static Overview | Static Transit | Google Developers. July 26, 2016. <https://developers.google.com/transit/gtfs/>.
- "Hamilton Street Railway System Map September 2016." Schedules, Routes and Maps. September 2016.  
<https://d3fpllf1m7bbt3.cloudfront.net/sites/default/files/media/browser/2016-02->

16/hsrssystemmap\_sept2016.pdf.

"Metrorail Pocket Guide." Maps | WMATA. 2017.

<https://www.wmata.com/schedules/maps/upload/english.pdf>.

"Mississauga MiWay 2017-2018 Business Plan & 2016 Budget." 2016 MiWay Business Plan. 2016. <http://www7.mississauga.ca/eCity/Budget/img/serviceareas/business-plans/2016-miway-summary.pdf>.

"Ontario Population Projections Update Spring 2016 Based on the 2011 Census." 2016. <http://www.fin.gov.on.ca/en/economy/demographics/projections/projections2015-2041.pdf>.

"Plan Interactif des transports en Ile-de-France." January 2017. <http://www.ratp.fr/plan-interactif/carteidf.php?lang=uk>.

"Solution to TTC's funding woes isn't higher fares: Editorial." Solution to TTC's funding woes isn't higher fares: Editorial. November 21, 2016. <https://www.thestar.com/opinion/editorials/2016/11/21/solution-to-ttcs-funding-woes-isnt-higher-fares-editorial.html>.

"Submission of the Ontario Human Rights Commission to the Transportation Standards Review Committee regarding the Initial Proposed Transportation Accessibility Standard." Ontario Human Rights Commission. August 2007. <http://www.ohrc.on.ca/en/submission-ontario-human-rights-commission-transportation-standards-review-committee-regarding#fn3>.

"Taking transit to the Tribunal." Taking transit to the Tribunal. July 2009. <http://www.ohrc.on.ca/en/annual-report-2009-2010-educate-empower-act/taking-transit-tribunal>.

"Trip Planner - Search form." Triplinx.ca. 2017. <https://www.triplinx.ca/>.

"TTC Subway Map." April 2015. [https://ttc.ca/PDF/Maps/Subway\\_Map.pdf](https://ttc.ca/PDF/Maps/Subway_Map.pdf).

"TTC System Map." January 01, 2017. [https://ttc.ca/PDF/Maps/TTC\\_SystemMap.pdf](https://ttc.ca/PDF/Maps/TTC_SystemMap.pdf).

City of Hamilton. "Transit Service Areas." City of Hamilton Open & Accessible Data. February 26, 2015. <https://www.hamilton.ca/city-initiatives/strategies-actions/open-accessible-data>.

Government of Ontario. "O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS." Ontario E-Laws. July 1, 2016.

<https://www.ontario.ca/laws/regulation/110191>.

Grewal, S. "Milton - a snapshot of a region struggling with growth." Thestar.com. December 21, 2015. <https://www.thestar.com/news/gta/2015/12/21/milton-a-snapshot-of-a-region-struggling-with-growth.html>.

Griffiths, Jeffrey. "Auditor General's Report: Review of Wheel-Trans Services - Sustaining Level and Quality of Service Requires Changes to the Program." Auditor General's Report. December 6, 2012. <https://algaonline.org/DocumentCenter/View/1295>.

Hamilton Street Railway Next Departures. 2017. [http://www.busweb.hamilton.ca:8008/hiwire?.a=iNextBusSelectStop&Geocode=-79918422%3B43262300&type=Stop&locDetail=STERLING at UNIVERSITY&IvrNum=1182&stopName=STERLING at UNIVERSITY](http://www.busweb.hamilton.ca:8008/hiwire?.a=iNextBusSelectStop&Geocode=-79918422%3B43262300&type=Stop&locDetail=STERLING%20at%20UNIVERSITY&IvrNum=1182&stopName=STERLING%20at%20UNIVERSITY).

Kalinowski, T. "Blind lawyer pulls out the stops in TTC fight." Thestar.com. April 27, 2007. [https://www.thestar.com/news/2007/04/27/blind\\_lawyer\\_pulls\\_out\\_the\\_stops\\_in\\_ttc\\_fight.html](https://www.thestar.com/news/2007/04/27/blind_lawyer_pulls_out_the_stops_in_ttc_fight.html).

Metrolinx, Brampton Transit, Burlington Transit, Durham Region Transit (DRT), GO Transit, Hamilton Street Railway (HSR), Milton Transit, MiWay (Mississauga Transit), Oakville Transit, Toronto Transit Commission (TTC), and York Region Transit (including Viva). "Trip Planner - Search form." Triplinx.ca. 2017. <https://www.triplinx.ca/en/trip-planner/4/JourneyPlanner>.

Metropolitan Transportation Authority. "Regional Transit Diagram 2017." 2017. <http://web.mta.info/maps/RegionalDiagram.pdf>.

Seider, Jeffrey. "Value Case for Accessible Transit in Canada." DèS Libris Canadian Electronic Library. 2013. <http://celarc.ca.ezproxy.library.yorku.ca/cppc/238/238169.pdf>.

Spurr, B. "Advocacy group encourages TTC riders to call for more funding, better service." Advocacy group encourages TTC riders to call for more funding, better service. January 30, 2017. <https://www.thestar.com/news/gta/2017/01/30/advocacy-group-encourages-ttc-riders-to-call-for-more-funding-better-service.html>.

Tate, Amelia. "This is what the Paris metro map looks like if you're in a wheelchair." CityMetric. June 18, 2015. <http://www.citymetric.com/transport/what-paris-metro-map-looks-if-youre-wheelchair-1153>.

Tourism Economics. "The Economic Impact of Tourism in New Jersey." 2015.  
<http://www.state.nj.us/state/pdf/2015-nj-economic-impact.pdf>.

Tourism Economics. "The Economic Impact of Tourism in New York." 2014.  
[https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/NYS\\_Tourism\\_Impact\\_2014.pdf](https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/NYS_Tourism_Impact_2014.pdf).

Washington Metropolitan Area Transit Authority. "Metro Facts 2016." About WMATA.  
2016. <https://www.wmata.com/about/upload/Metro-Facts-2016.pdf>.

## Completion Plan

Step	Completion Date	Check-list
<ul style="list-style-type: none"> <li>Students submit a <b>Notification of Supervisor and Advisor (p. 14)</b> and a <b>1- to 2-page research outline</b> to the Graduate Program Office for the approval of the Graduate Program Director.</li> </ul>		
↓		
<ul style="list-style-type: none"> <li>Students submit an <b>approved MRP Proposal</b> along with a <b>Proposal Submission Form (p. 15)</b>, regardless of whether human participants are involved, to the Graduate Program Office.</li> <li>If human participants are involved in the research, students will initiate the documentations as listed in <i>Human Participants Research Protocol</i>. <b>If the research is not funded and at minimal risk</b>, the Proposal will be approved by the Graduate Programme/Department Ethics Review Committee under an expedited review process (maximum of a 2 week turnaround); <b>If the research is funded or at high risk</b>, the Proposal will be approved by the Human Participants Review Sub-Committee through the Office of Research Ethics (ORE) (approximately 20 working days or 4 weeks from the date of receipt of all required documentation in the ORE, 5<sup>th</sup> Floor of York Research Tower).</li> </ul>		
↓		
<ul style="list-style-type: none"> <li><b>(Optional but highly recommended)</b> Students have a joint meeting with the Supervisor and Advisor.</li> </ul>		
↓		
<ul style="list-style-type: none"> <li>Students submit an interim draft to the Supervisor and Advisor.</li> </ul>		
↓		
<ul style="list-style-type: none"> <li>Students submit the 2<sup>nd</sup> draft to the Supervisor and Advisor.</li> </ul>		
↓		
<ul style="list-style-type: none"> <li><u>Approval</u> of the MRP by the Supervisor, Advisor (and the Reader if applicable).</li> <li>The Supervisor finalizes a Final Discussion date, time and location.</li> </ul>		
↓		
<ul style="list-style-type: none"> <li>Latest date of the MRP Final Discussion meeting.</li> <li>Students bring a hardcopy of the <b>MRP Final Discussion Report (p. 17)</b> to the meeting for completion by the Supervisor.</li> <li>The Supervisor fills out a <b>MRP Final Discussion Report (p. 17)</b> and submits it along with an <b>unbound</b> hardcopy of the finalized MRP to the Graduate Program Office.</li> <li>Students email the finalized MRP to the Graduate Program Assistant.</li> </ul>		
↓		
<ul style="list-style-type: none"> <li>The Supervisor determines the final grade for the MRP, which is either a <b>Pass</b> or <b>Fail</b>.</li> <li>The Graduate Program Office forwards the final grade and files a convocation request to the Office of the Registrar.</li> </ul>		