2023 TTC Service Changes and Transit Equity in Toronto

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Introduction

Following the approvals of the Toronto Transit Commission (TTC) Conventional and Wheel-Trans Budget and the 2023 Operating Budget, the TTC revealed the first phase of their 2023 Service Alignment plan. Phase 1 will be implemented on March 26th, 2023, and will result in service changes on 39 routes (one streetcar route, two subway routes, and 36 bus routes), which is 20% of all TTC routes.[1]

Since the winter of 2020, the TTC has been operating at reduced service levels as the COVID-19 pandemic forced widespread limitations on outdoor mobility. The frequency of service increased slowly over the past three years, with current operations sitting at 96% of pre-pandemic levels.[1] However, according to the February 28th, 2023 report prepared for the TTC Board by the Acting Chief Strategy and Customer Officer, the proposed service changes will bring service levels down further to 91% of pre-pandemic levels on average.

Researchers and public transit advocates, among others, have repeatedly raised concerns over the potential outcome of these proposed service cuts. On February 8th, 2023, more than 100 researchers in the Toronto area wrote an open letter to the TTC, outlining that the proposed service cuts would lead to more congestion, a weaker economy, and poor environmental and health outcomes.[2] Another key concern is how these service cuts may negatively impact marginalized populations. Lower-income people, those with precarious employment, new immigrants, and older and younger people often depend on public transit for their everyday needs, compared to less deprived groups for whom public transit may sometimes be a choice.

Unfortunately, detailed data on the affected TTC routes was not available for public discussion and debate; it was only made available on February 28th, 2023, after the service alignment proposal was approved. In this brief report, we plotted the affected routes (i.e., those facing service cuts) within the City of Toronto in relation to locations within the city where there are higher levels of material deprivation, dependency, and ethnic concentration. The key goal was to identify if the TTC service cuts will disproportionately affect locations with a high concentration of marginalized population groups.

1 Toronto Transit Commission- TTC. (2023, February 28). 2023 Service Alignment – Phase 1. Toronto Transit Commission. Retrieved from https://ttc-cdn.azureedge.net/-/media/Project/TTC/DevProto/Documents/Home/Public-Meetings/Board/2023/February-28/6_2023_Service_Alignment_Phase_1.pdf?rev=f91163b68acc4f31940bb9d9e727caf4&hash=A6AF38B4B5650B6633B1858C05193897

2 Klumpenhouwer, W., Palm, M., Farber, S., et al. (2023, February 8). Protect Toronto's Public Transit from A Ridership Death Spiral: An Open Letter to Federal, Provincial, and Municipal Governments [Open Letter]. Retrieved from bit.ly/open-letter-ttc

Affected Routes

There are a total of 39 TTC routes identified in the February 28th, 2023 report that will experience service changes.[3] For each of these routes, the frequency of service will change (either an increase or decrease) and/or service reliability will be improved, at different time periods. This report specifically focuses on the routes that will experience service cuts, which we define as routes that will have a frequency of service change that leads to longer wait times. For our analysis, we selected the routes that will experience the greatest service cuts based on the following two criteria:

1. Routes with a 10% or more frequency reduction or complete route suspension that will lead to longer wait times, and
2. Routes where there will be more time periods with reduced frequency than time periods with increased frequency.

Based on the Service Alignment report, 28 TTC routes meet these criteria (marked in green in Figure 1). While some of these 28 routes will experience both longer and shorter wait times throughout the day, 15 routes will experience longer wait times only. See Appendix 1 for the 28 routes included in our analysis.

3 Toronto Transit Commission- TTC. (2023, February 28). 2023 Service Alignment – Phase 1. Toronto Transit Commission. Retrieved from https://ttc-cdn.azureedge.net/-/media/Project/TTC/DevProto/Documents/Home/Public-Meetings/Board/2023/February-28/6_2023_Service_Alignment_Phase_1.pdf?rev=f91163b68acc4f31940bb9d9e727caf4&hash=A6AF38B4B5650B6633B1858C05193897

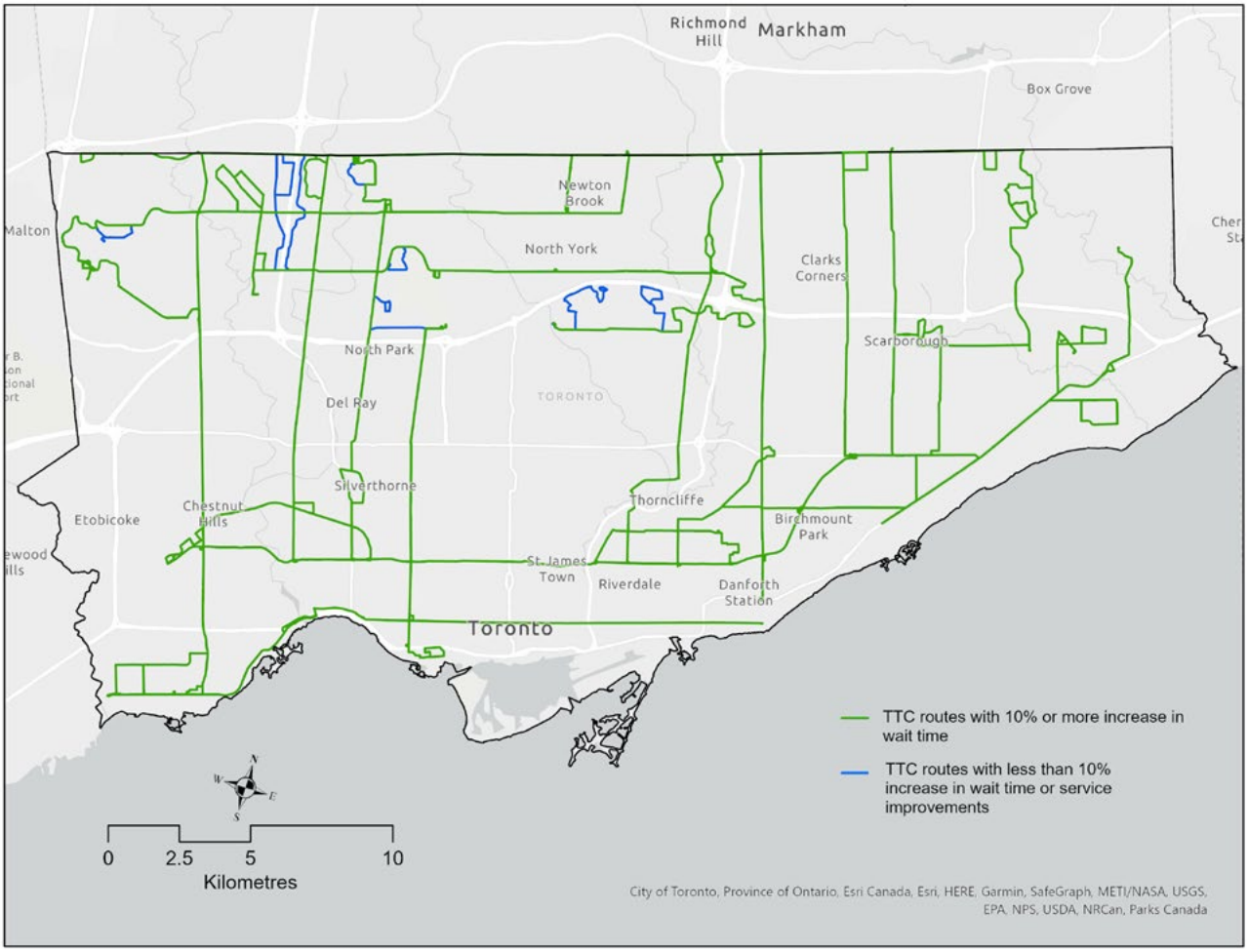


Figure 1. Map of all the routes that will experience service changes, both service increases and cuts.

Source: Based on the 2023 Service Alignment – Phase 1 report created for the February 28th TTC Board meeting.[3] *Route data published on Open Data Toronto by the Toronto Transit Commission on March 14th, 2023 (https://open.toronto.ca/dataset/ttc-routes-and-schedules/). Toronto municipal boundary data published on Open Data Toronto by Information & Technology on July 23rd, 2019. 2019 (https://open.toronto.ca/dataset/regional-municipal-boundary/). Dissemination area data from the 2016 Statistics Canada data.*[4,5]

4 Statistics Canada. (2016). Boundary Files, Reference Guide, Second Edition, 2016 Census. Statistics Canada Catalogue no. 92-160-G. Retrieved from https://www150.statcan.gc.ca/n1/pub/92-160-g/92-160-g2016002-eng.htm

5 Statistics Canada. (2016). Dissemination Areas Boundary File, 2016 Census. Statistics Canada Catalogue no. 92-169-X.

Marginalized Communities

Data from the 2016 Ontario Marginalization Index (ON-Marg) was used to identify locations within the city with high concentrations of marginalized populations.[6,7] In this index, a total of 18 dissemination area (DA)-level socio-demographic variables, available through the population census of Canada, were analyzed using a factor analysis approach. This process produced four factors, each representing a distinguishable aspect of social marginalization. Each DA was assigned a factor score for each of the four factors of marginalization (resulting in four scores for each DA). A high factor score would mean that the DA is more marginalized than the Canadian average[6] for that specific marginalization factor. Specifically, we considered three aspects of marginalization due to their potential relationship to public transit use - (1) Material Deprivation, (2) Dependency, and (3) Ethnic Concentration.

Material Deprivation: Estimated based on the proportion of the population aged 20+ without a high-school diploma, the proportion of families who are single-parent families, the proportion of total income from government transfer payments for the population aged 15+, the proportion of the population 15+ who are unemployed, the proportion of the population considered low-income, and the proportion of households living in dwellings that are in need of major repair. Material deprivation can be used as a proxy to measure poverty.[6]

Dependency: Estimated based on the proportion of the population who are aged 65 and older, the dependency ratio (total population 0-14 and 65+/total population 15 to 64), and the proportion of the population not participating in the labour force who are aged 15+. This measure represents concentration of population who do not have income from employment. [6]

Ethnic Concentration: Estimated based on the proportion of the population who are recent immigrants, and the proportion of visible minority population.[6]

To identify systematic clusters of marginalized DAs or neighbourhoods, a local cluster analysis (also known as the hot-spot analysis) was conducted using the Getis-Ord Gi* method.[8,9] Simply put, the average marginalization (factor score) of a DA and neighbouring DAs is compared with the city-wide average. If the average is statistically higher, then the DA is identified as a "hot-spot". Separate hot-spot analyses were conducted for each of the three types of marginalization.

6 Matheson, F.I., Maloney, G., van Ingen, T.; Ontario Agency for Health Protection and Promotion (Public Health Ontario). (2022). 2016 Ontario marginalization index: user guide. 1st revision. Toronto, ON: St. Michael's Hospital (Unity Health Toronto); Joint publication with Public Health Ontario. https://www.publichealthontario.ca/-/media/documents/o/2017/on-marg-userguide.pdf

7 Matheson, F.I., van Ingen, T., & Maloney, G. (2018). 2016 Ontario marginalization index. [Data set]. St. Michael's Hospital joint publication with Public Health Ontario.

8 Getis, A., & Ord, J. K. (1992). The analysis of spatial association by use of distance statistics. Geographical Analysis 24, 190-206.

9 Ord, J. K., & Getis, A. (1995). Local spatial autocorrelation statistics: distributional issues and an application. Geographical Analysis 27, 286-306

Findings

TTC decisions were likely based on a comprehensive analysis of public transit trip data, and as a result, our report does not elaborate on the relationship between transit ridership and service modifications. For context, Figure 2 shows the pre-pandemic transit use "hot spots" within the city. For this map, we used data from the 2016 Transportation Tomorrow Survey (TTS)[10] and applied a Getis-Ord Gi* hot spot analysis on total transit trips generated within each traffic analysis zone (TAZ). We see that while some of the routes with reduced service go through high transit-use neighbourhoods, the majority of these routes go through neighbourhoods that are not hot spots. Put differently, it appears that the majority of these routes will go through neighbourhoods where overall transit ridership was not high overall, pre-pandemic.

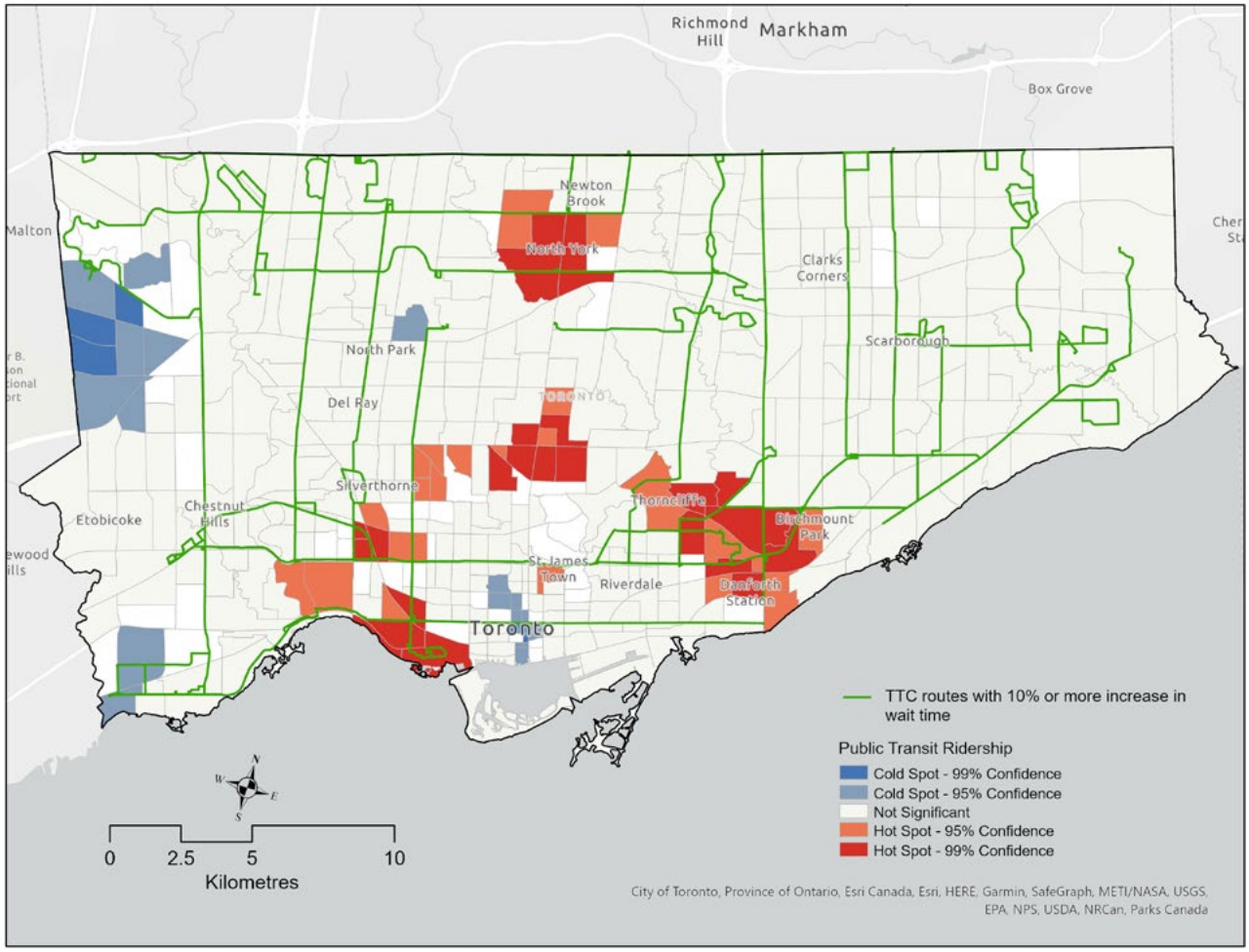


Figure 2: Hot spots of public transit ridership (total trips within a TAZ), in relation to TTC routes facing 10% or more service cuts.

10 Malatest. (2018, February). TTS 2016 Data Guide. Retrieved from http://dmg.utoronto.ca/pdf/tts/2016/2016TTS_DataGuide.pdf

However, a closer exploration of locations in Toronto where marginalized people live begins to paint a different picture. First, focusing on material deprivation, we see a correlation between the location of reduced TTC services and the hot spots of materially deprived neighbourhoods (which can be used as an indicator of poverty concentration) within the city (Figure 3). More specifically, 26 of the 28 TTC (93%) routes that will experience at least a 10% increase in wait times go through or connect to a neighbourhood with high material deprivation. The majority of these neighbourhoods are located in the east and west ends of the city where public transit users would primarily rely on TTC bus services to connect to employment, other city-wide services and other destinations. The pre-pandemic transit services in these neighbourhoods were already poor with long wait times and long overall commute times. Further service reduction will make these locations even less accessible.

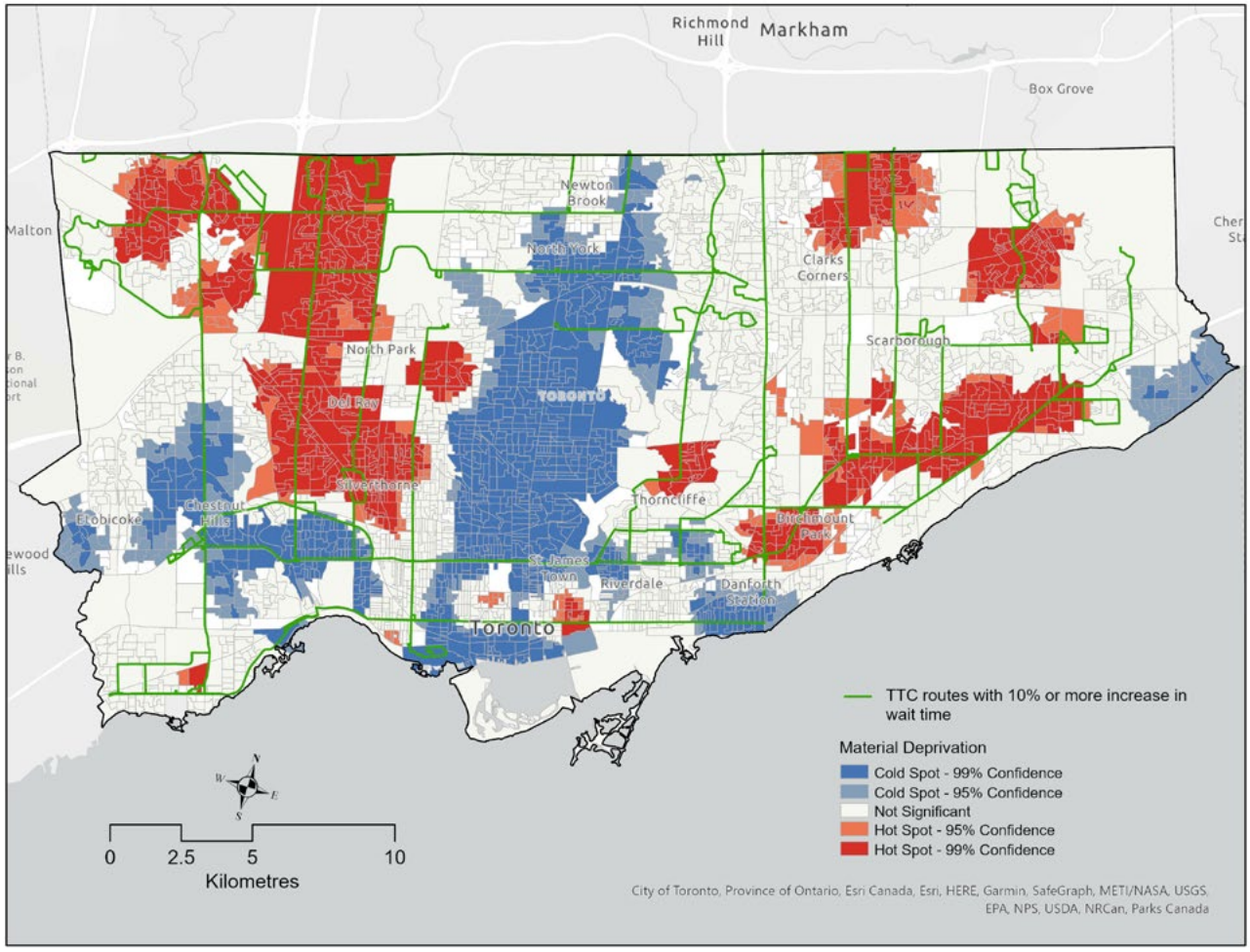


Figure 3: Hot spots of Material Deprivation, in relation to the TTC routes facing 10% or more service cuts.

A similar pattern is observed when these TTC routes are compared with the local area-level concentrations of dependency (concentration of older adults, children and those who do not have income from employment) (Figure 4). 22 of the 28 TTC routes (79%) that will experience at least a 10% increase in wait times go through or connect to a neighbourhood with high-level dependency. The majority of these neighbourhoods are located in the northeast and western parts of the city, in the more suburban locations that already had poor transit accessibility. Further TTC service cuts will create more barriers to mobility in these marginalized neighbourhoods.

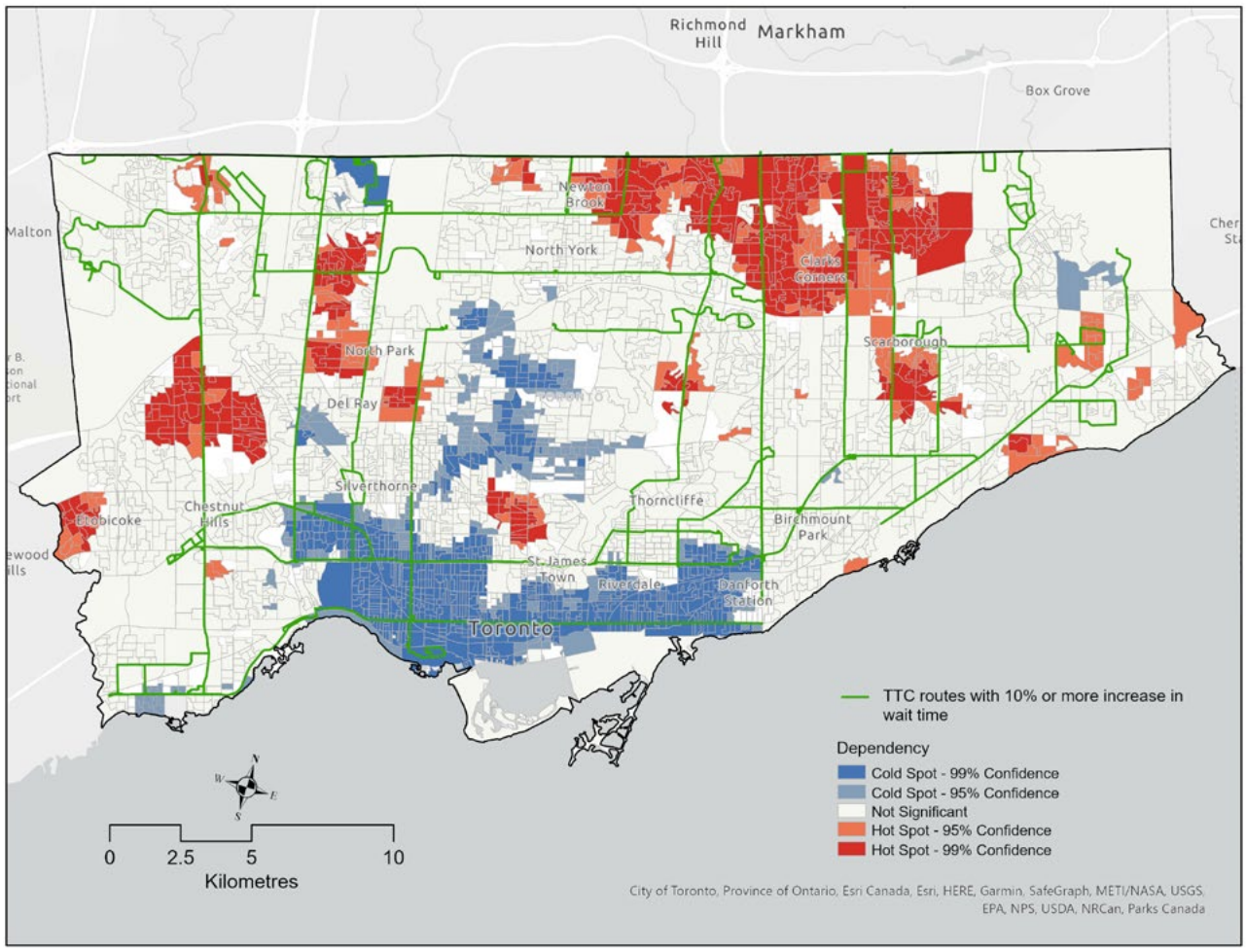


Figure 4: Hot spots of Dependency, in relation to the TTC routes facing 10% or more service cuts.

Lastly, neighbourhoods with high concentrations of recent immigrants and "visible minorities" are located toward the north of Toronto, including in Scarborough, North York, and Etobicoke. These locations already had poor public transit accessibility pre-pandemic. 24 of the 28 TTC routes (86%) that will experience at least a 10% increase in wait times go through or connect to a neighbourhood with a high level of ethnic concentration, adding further to the mobility barriers in these neighbourhoods (Figure 5).

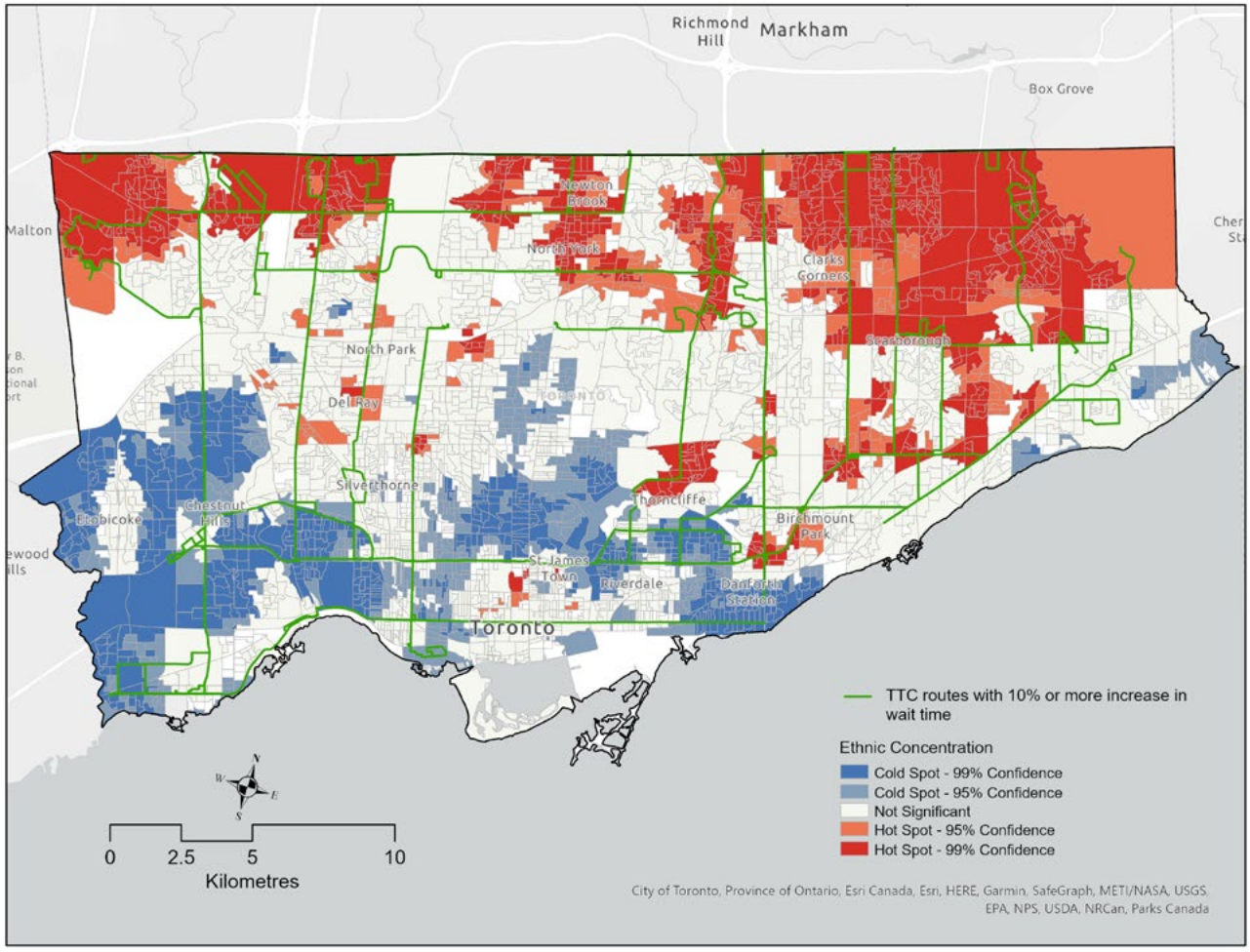


Figure 5: Hot spots of Ethnic Concentration, in relation to the TTC routes facing 10% or more service cuts.

In contrast, only four TTC routes will experience at least 10% service improvement starting on March 26th, 2023 based on our definition (excluding two overnight routes). While these routes were not the focus of this report, Appendix 2 indicates that the effect of these service improvements in marginalized communities would be modest at best, due to the very limited geographical scope of these improvements.

Key Takeaways

In the 2023 Service Alignment – Phase 1 report, the TTC recognizes "the essential role [public transit] plays for equity deserving communities and that travel by transit is not just for work and school, but also for day-to-day needs like grocery shopping, access to childcare and other services and socializing."[11] Additionally, the report states that "The TTC continues to apply an equity lens to planning and seeks to maximize benefits of investment and protect service for the communities that depend on transit the most." The findings in this report indicate that Toronto's most marginalized neighbourhoods will likely be disproportionately affected by the TTC service cuts that go into effect on March 26th, 2023. These neighbourhoods may not generate the highest amounts of public transit trips, but residents in these neighbourhoods may be more dependent on public transit for their everyday needs compared to other parts of the city. The proposed service changes by the TTC will likely make these neighbourhoods more mobility poor, creating additional barriers to the residents' participation in employment, education, and society in general.[12]

The broad observations presented in this paper raise important questions about TTC policy goals, particularly with regard to their geographical implications. If the goal of the TTC service alignment policy is to maximize total public welfare (or in this context, minimize the loss of welfare),[13] then the approved proposal may be able to achieve that. It is possible that for neighbourhoods with very high public transit use, the impacts of the upcoming service cuts will be modest. However, if the goal of the TTC policy is to create a "just" public transportation system focusing on individuals who have the lowest level of well-being, then the greatest benefit should be provided to those with the least advantage.[14] This is where the 2023 TTC Service Alignment Phase 1 plan seemingly fails to deliver, as our observations indicate that the most marginalized neighbourhoods in Toronto will likely become less accessible than others as a result of these service cuts.

Reliable and efficient public transportation is a critical public infrastructure for equity-deserving population groups. At a time when all levels of the government are committing to address affordability and inequality, the proposed TTC service cuts are not justified. More broadly, a robust public transportation infrastructure is critical in achieving a sustainable, healthier, and prosperous future.

11 Toronto Transit Commission- TTC. (2023, February 28). 2023 Service Alignment – Phase 1. Toronto Transit Commission. Retrieved from https://ttc-cdn.azureedge.net/-/media/Project/TTC/DevProto/Documents/Home/Public-Meetings/Board/2023/February-28/6_2023_Service_Alignment_Phase_1.pdf?rev=f91163b68acc4f31940bb9d9e727caf4&hash=A6AF38B4B5650B6633B1858C05193897

12 Allen, J., & Farber, S. (2020). Planning transport for social inclusion: An accessibility-activity participation approach. Transportation Research. Part D: Transport and Environment, 78, 102212. https://doi.org/10.1016/j.trd.2019.102212.

13 Upton, R. (2002). Planning praxis: Ethics, values and theory. Town Planning Review, 73(3), 253-269.

14 Lucas, K., van Wee, B., & Maat, K. (2016). A method to evaluate equitable accessibility: combining ethical theories and accessibility-based approaches. Transportation, 43, 473-490.

We recognize the difficult financial challenges that the TTC is currently facing. But our hope is that these service cuts will be short-lived while the TTC, the City of Toronto, and the Province of Ontario explore other sources of revenue to fund the operation and future growth of Toronto's dated public transit infrastructure. A recent open letter to the TTC outlined some detailed proposals.[15] These new revenue sources may include an increased share of gasoline tax revenue (collected by the province) to be dedicated to public transit improvement, new or increased parking levy (collected by the City), and an integrated affordable housing policy framework (by the Federal Government) that includes considerations for public transit. The Province and the City should work more closely so that more power is granted to the City of Toronto to identify new areas of revenue generation to fund its public transit infrastructure.

15 Klumpenhouwer, W., Palm, M., Farber, S., et al. (2023, February 8). Protect Toronto's Public Transit from A Ridership Death Spiral: An Open Letter to Federal, Provincial, and Municipal Governments [Open Letter]. Retrieved from bit.ly/open-letter-ttc

Appendix 1

Table 1. All TTC routes that will experience a 10% or more service reduction based on the 2023 Service Alignment – Phase 1 report.

Route Name	Number of Time Periods of Service Reduction or Suspension	Number of Time Periods of Service Increased
2 Bloor-Danforth	4	1
4 Sheppard	14	0
9 Bellamy	9	4
21 Brimley	4	0
24 Victoria Park	13	2
25 Don Mills	11	0
925 Don Mills Express	5	0
29 Dufferin	8	2
929 Dufferin Express	6	1
35 Jane	10	3
935 Jane Express	4	2
36 Finch West	16	0
37 Islington	5	5
40 Junction-Dundas West	10	4
41 Keele	3	0
941 Keele Express	3	0
60 Steeles West*	2	0
70 O'Connor	2	0
984 Sheppard West Express**	8	0
86 Scarborough	11	1
87 Cosburn	8	1
110 Islington South	10	1
122 Graydon Hall	3	0
133 Neilson	13	1
501 Queen	4	0
905 Eglinton East Express	9	0
943 Kennedy Express	2	0
953 Steeles East Express	2	0

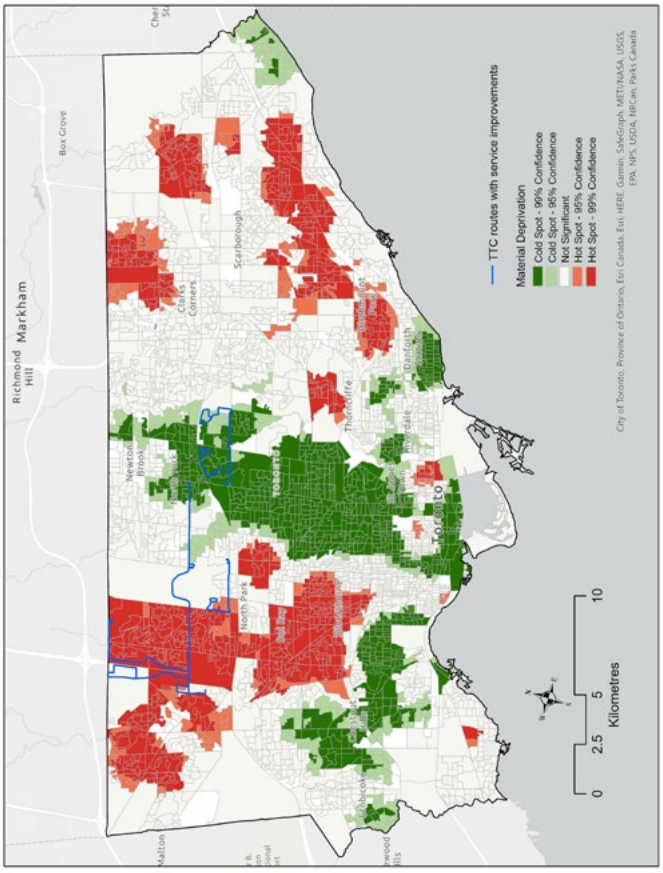
**There is an increase in the 960 Steeles West Express service to account for the 60 Steeles West suspension during peak hours.*
*** 84 Sheppard West is getting service increases during many time periods and few service reductions (none 10% or more).*

Source: Based on the 2023 Service Alignment – Phase 1 report created for the February 28th TTC Board meeting.[16]

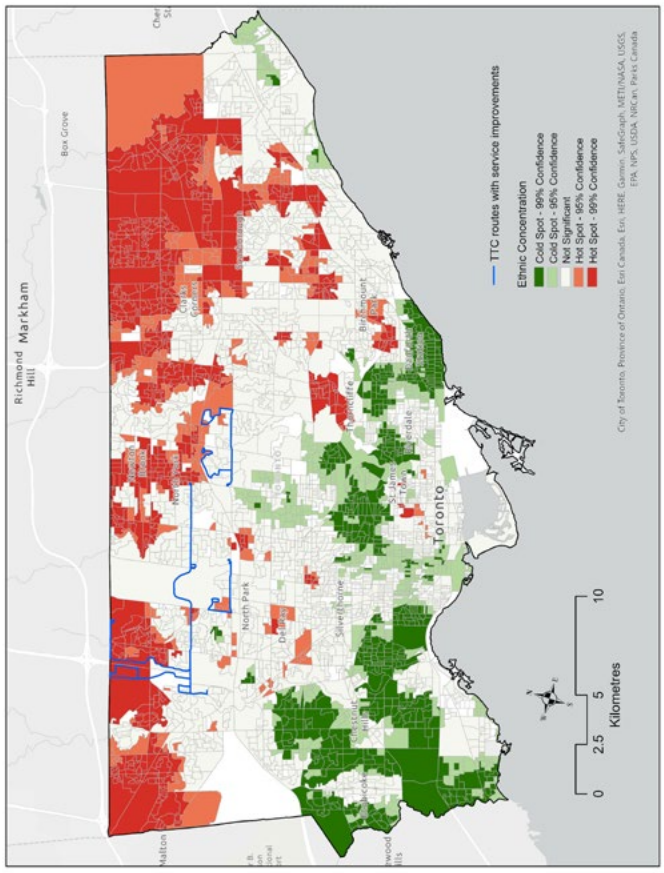
16 Toronto Transit Commission- TTC. (2023, February 28). 2023 Service Alignment – Phase 1. Toronto Transit Commission. Retrieved from https://ttc-cdn.azureedge.net/-/media/Project/TTC/DevProto/Documents/Home/Public-Meetings/Board/2023/February-28/6_2023_Service_Alignment_Phase_1.pdf?rev=f91163b68acc4f31940bb9d9e727caf4&hash=A6AF38B4B5650B6633B1858C05193897

Appendix 2

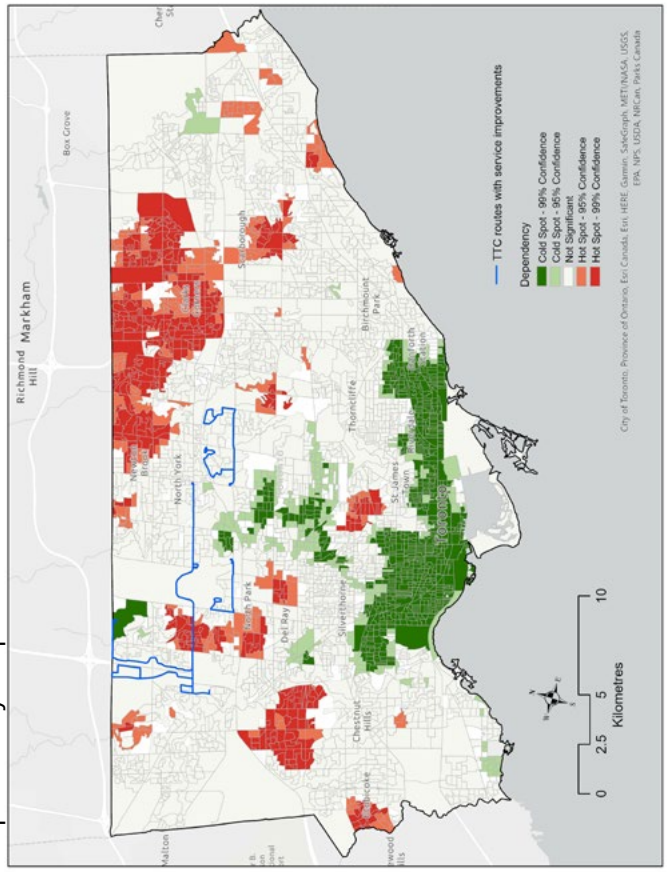
Material Deprivation Map



Ethnic Concentration Map



Dependency Map



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