

Bike to School

Analysis of cycling stress and accessibility for
Toronto high schools

- 11.520 Final Project -



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Who Are We?

3 graduate students in Transportation & City Planning at MIT

Lauren Craik

- Toronto born (not quite bred)
- Transportation and City Planning Grad Student

Patrick Meredith-Karam

- Toronto bred (not born)
- U of T Engineering undergrad
- Current Transportation & Technology Policy Masters

Andrey Prigov

- New York City native (visited Toronto ten years ago!)
- City Planning Grad Student



2050 goal of
75% of trips
under 5 km by
walk or bike

The number of students
being driven to school by
their parents has doubled to

30%



ActiveTO Projects

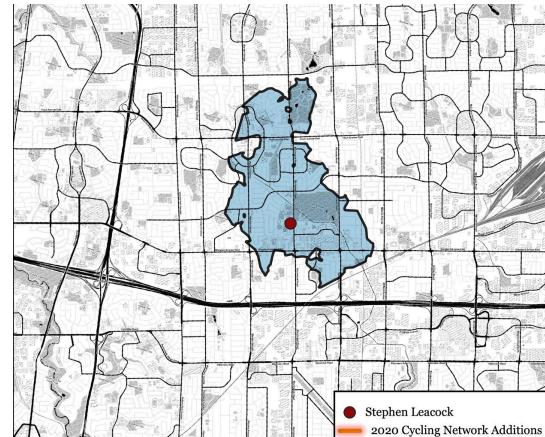
- City of Toronto program to quickly add more cycle lanes to provide for safer transportation options during **COVID-19**
- Target essential trips, front-line workers, and vulnerable road users.
- Added **25 km** of temporary lanes, as well as fast tracked previously planned 2020 projects
- **40km** total of new lanes

Attachment 1:
Cycling Network Plan Installations: Bloor West Bikeway Extension and ActiveTO Map

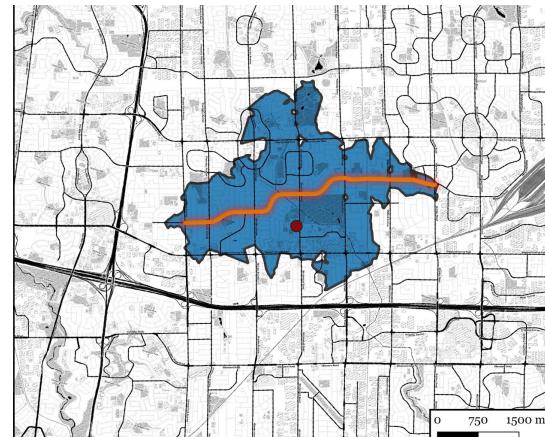


RESEARCH QUESTIONS

- How “stressful” is biking to high school currently? How accessible is each high school given a certain stress budget?
- How did the additions from ActiveTO add to the network to reduce stress?



Pre-2020 Cycling Impedimente



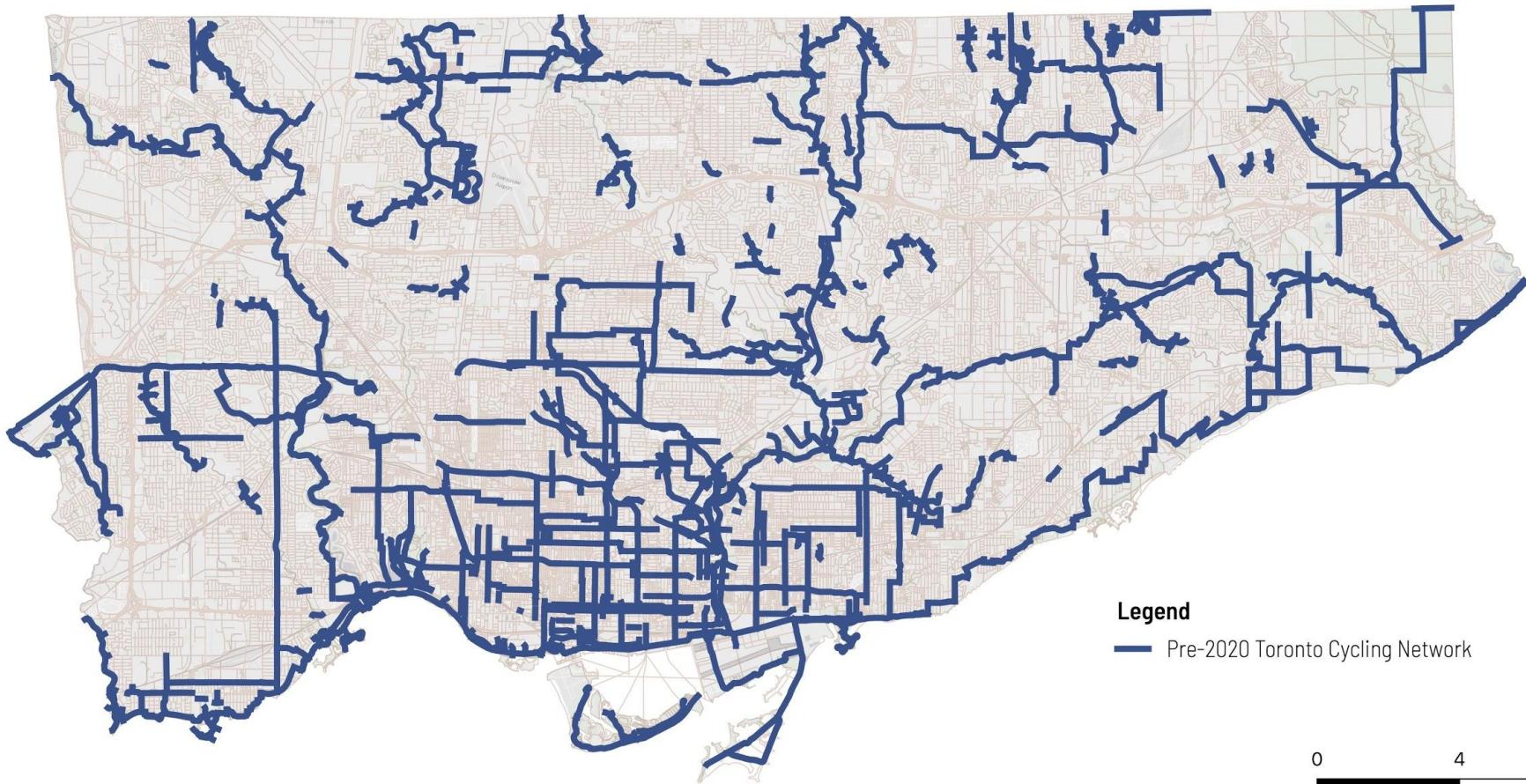
Post-2020 Cycling Impedimente

CYCLE TORONTO

Partnered with **Cycle Toronto**: a not-for-profit advocacy, education and encouragement organization for cycling in Toronto

The image shows the homepage of the Cycle Toronto website. At the top is a dark blue header bar with the Cycle Toronto logo (a yellow circle with three white lines) and the word "Cycle" in white. To the right are navigation links: "About", "Our Work", "Events", "News", "Resources", "Get Involved!", and a yellow "Join / Renew" button. Below the header is a large, semi-transparent blue overlay containing white text. The text reads: "We advocate for a safe, healthy and vibrant cycling city for all" followed by a smaller paragraph: "Cycle Toronto is a member-supported not-for-profit organization that works to transform our city's cycling culture." At the bottom left of this overlay is a blue "Donate" button. The background of the page is a photograph of a large group of people on bicycles gathered outdoors.

Pre-2020 Toronto Cycling Network



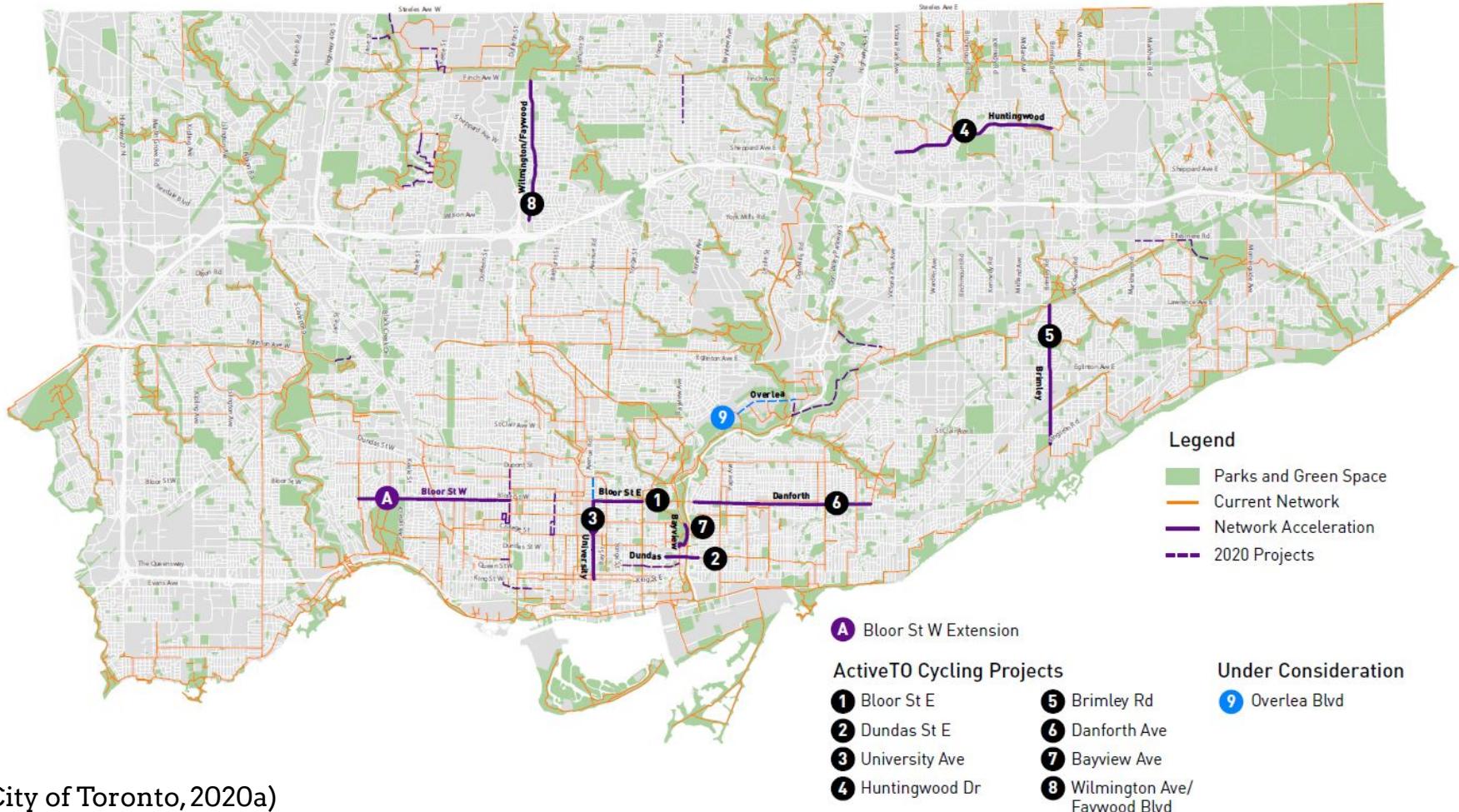
Legend

Pre-2020 Toronto Cycling Network

0 4 8 km

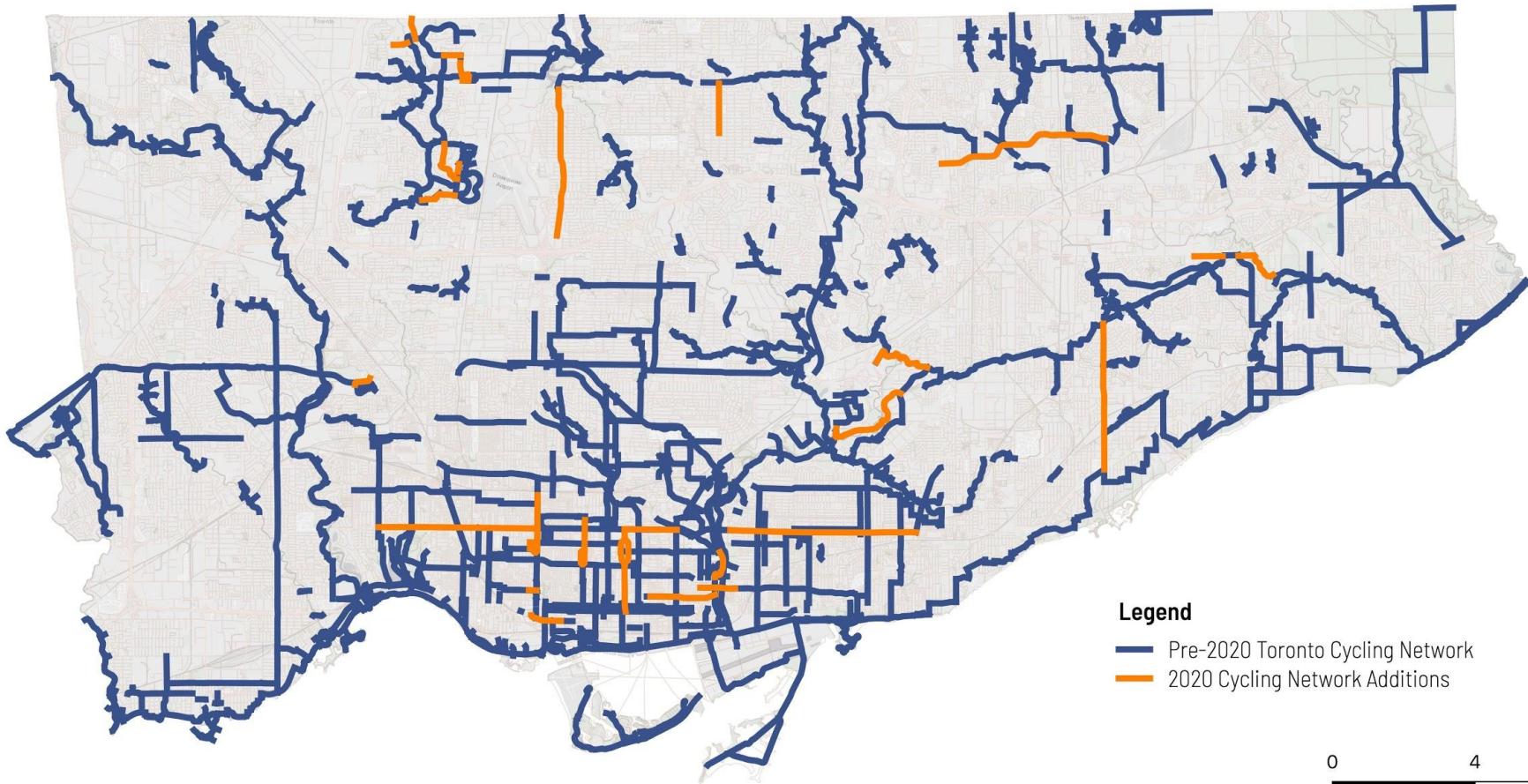
Attachment 1:

Cycling Network Plan Installations: Bloor West Bikeway Extension and ActiveTO Map



(City of Toronto, 2020a)

2020 Toronto Cycling Network

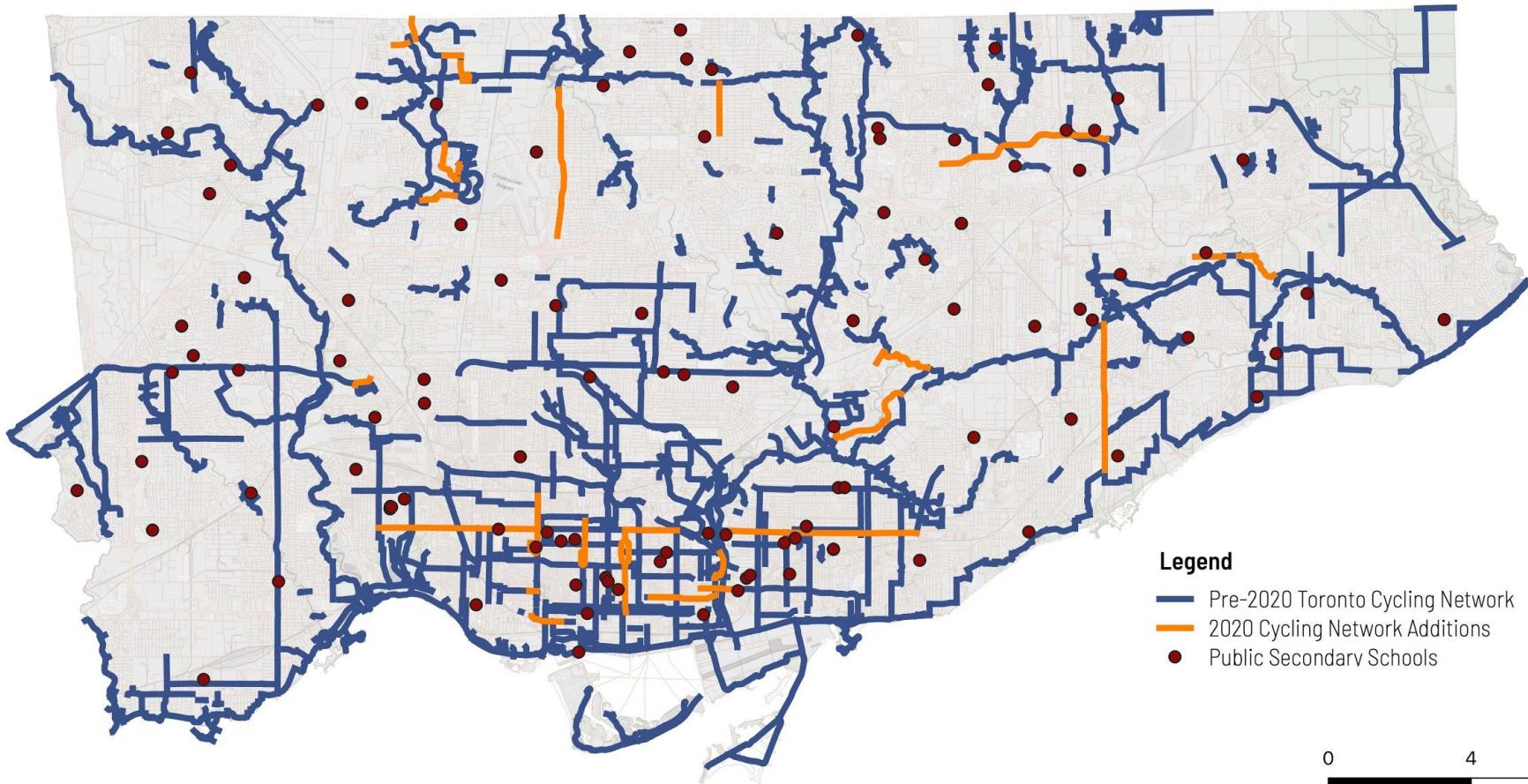


Legend

- Pre-2020 Toronto Cycling Network
- 2020 Cycling Network Additions

0 4 8 km

2020 Toronto Cycling Network

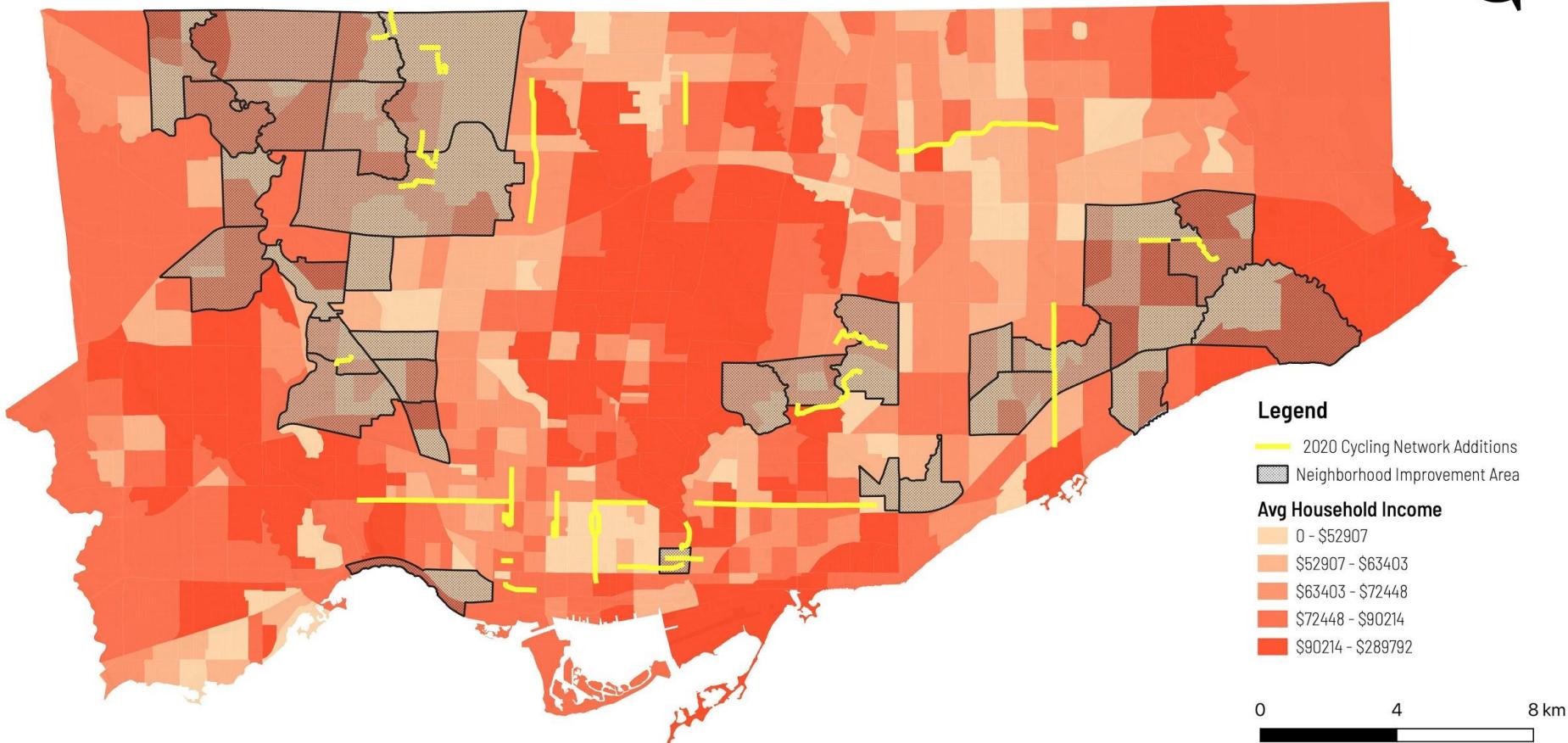


Legend

- Pre-2020 Toronto Cycling Network
- 2020 Cycling Network Additions
- Public Secondary Schools

0 4 8 km

Additions concentrated in low and middle income areas



Level of Traffic Stress (LTS)

1) Classify road links

1	Multi-use trails
2	School Safety Zones
3	Local Roads
4	Minor Arterial
5	Major Arterial

2) Adjust for cycling protection

-2.5	Grade separation
-2	Double lines, wide lane
-1.5	Painted lanes
-1	Edge lines
0	Sharrows

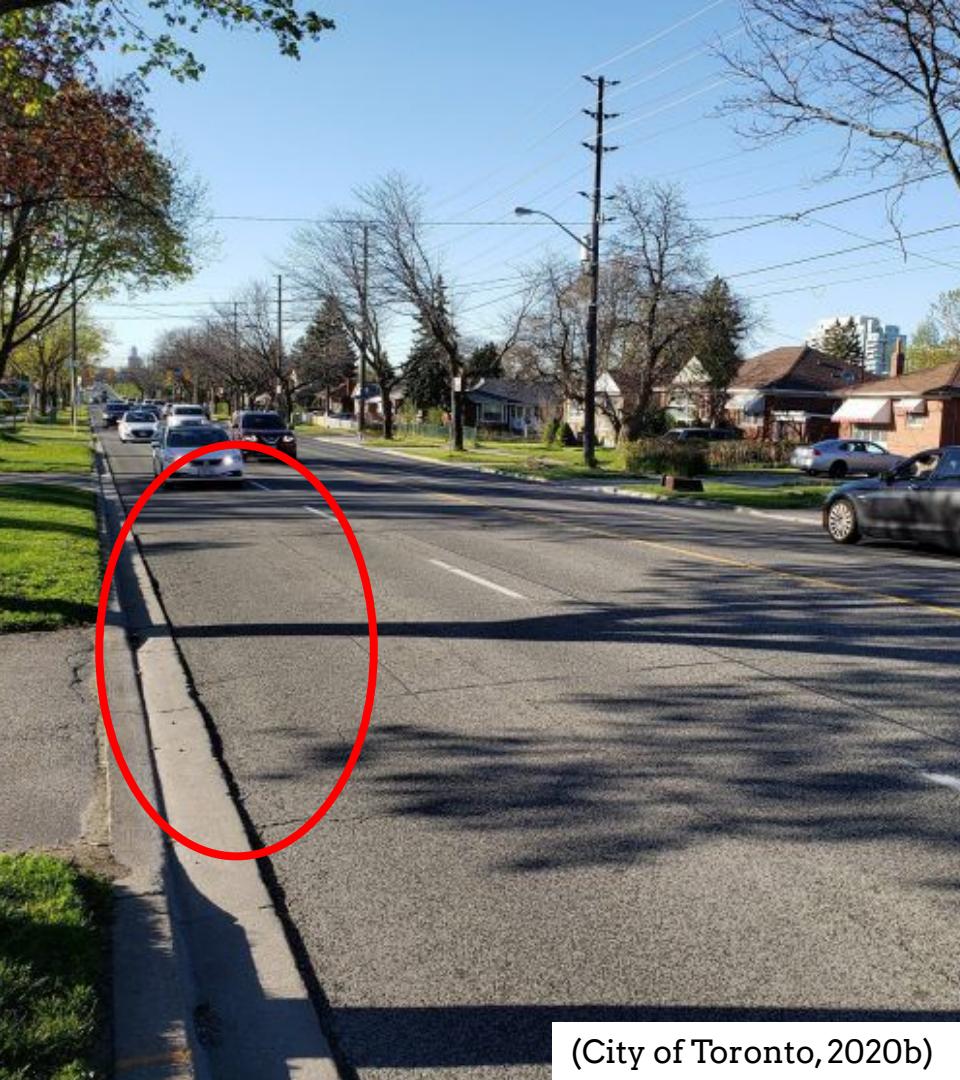
3) Discount travel speed based on stress level

1	25 km/hr
2	20 km/hr
3	13 km/hr
4	7 km/hr
5	2.5 km/hr

What is cycle stress?

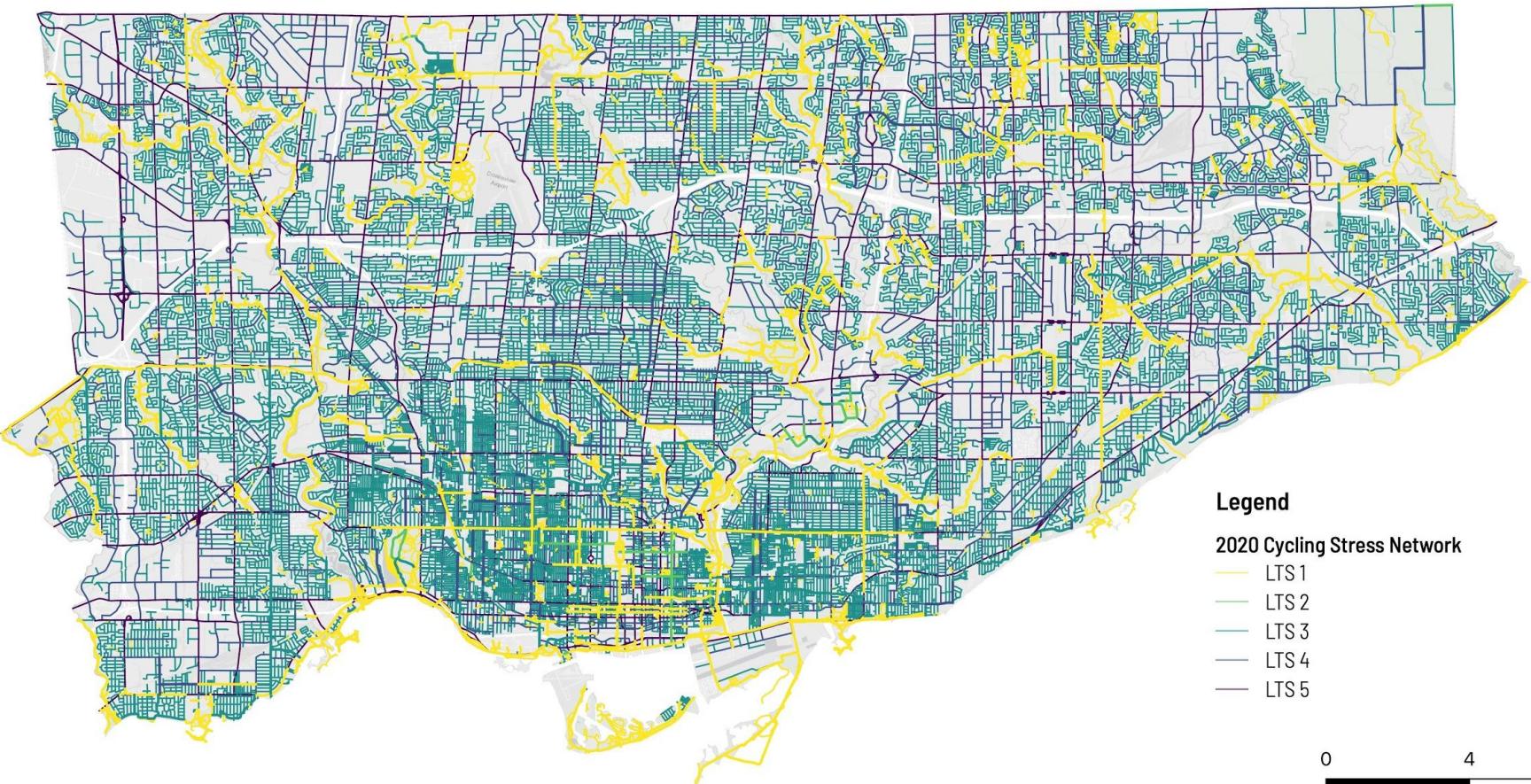


(City of Toronto, 2020b)



(City of Toronto, 2020b)

2020 Toronto Cycling Stress Network



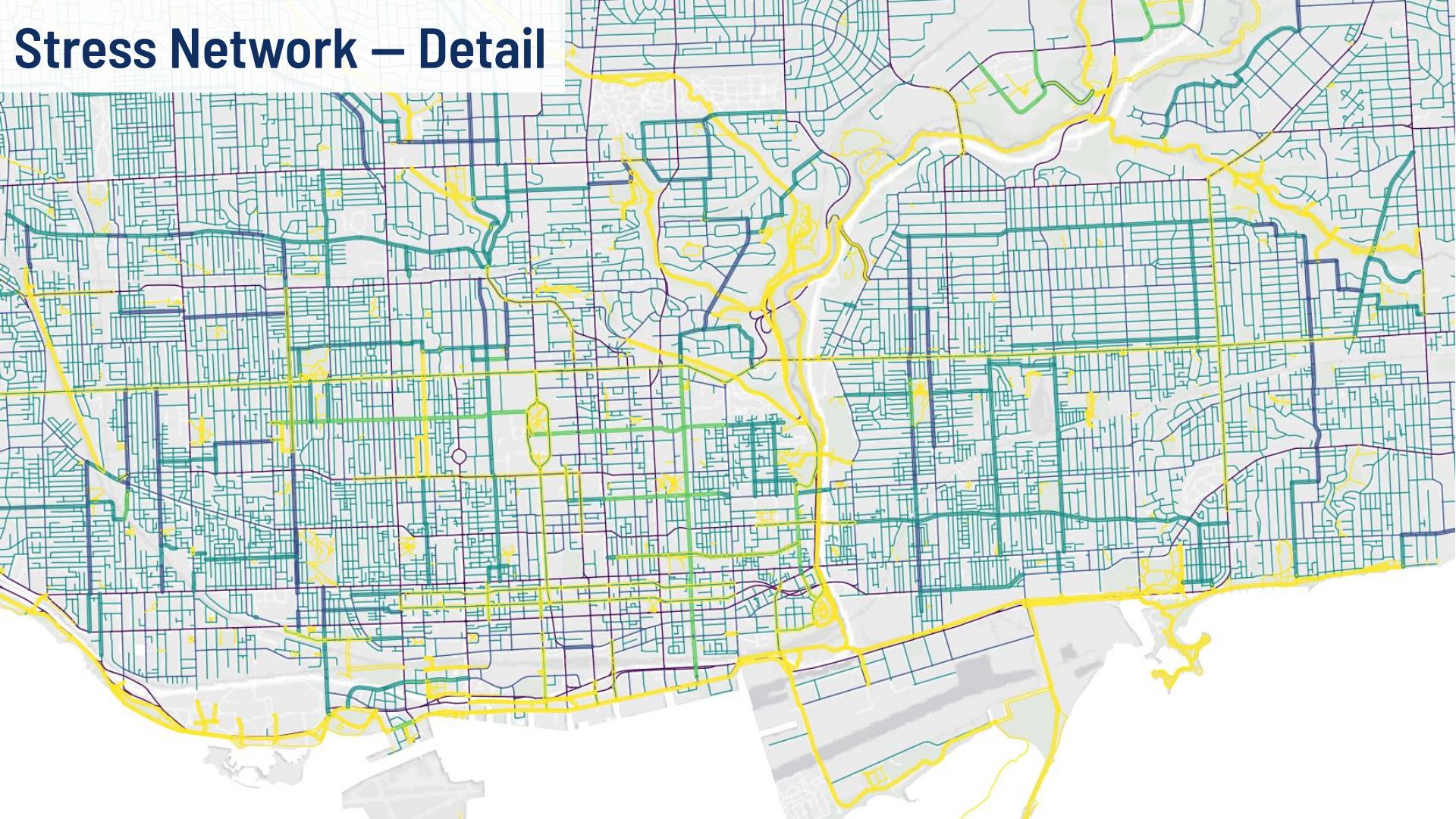
Legend

2020 Cycling Stress Network

- LTS 1
- LTS 2
- LTS 3
- LTS 4
- LTS 5

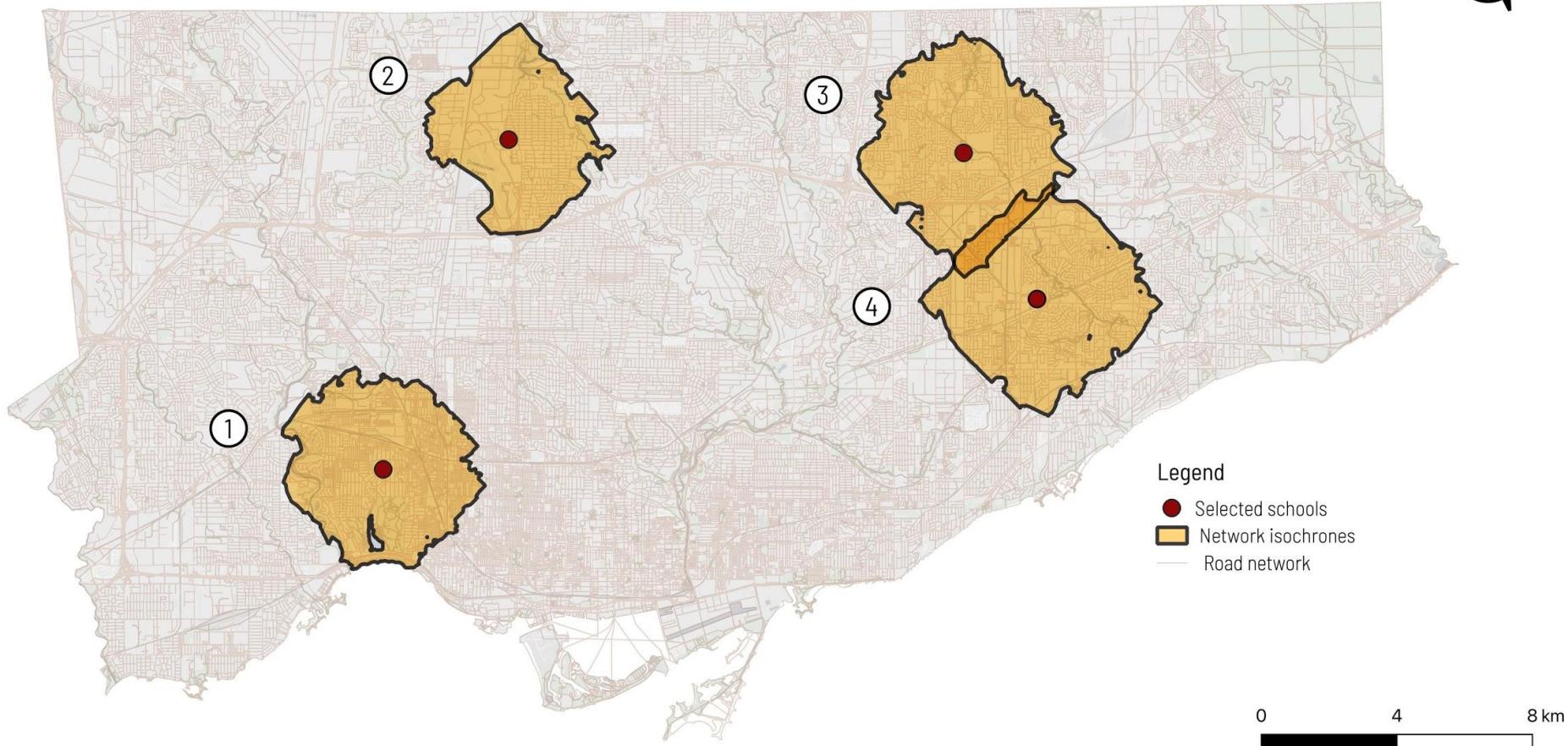
0 4 8 km

Stress Network – Detail



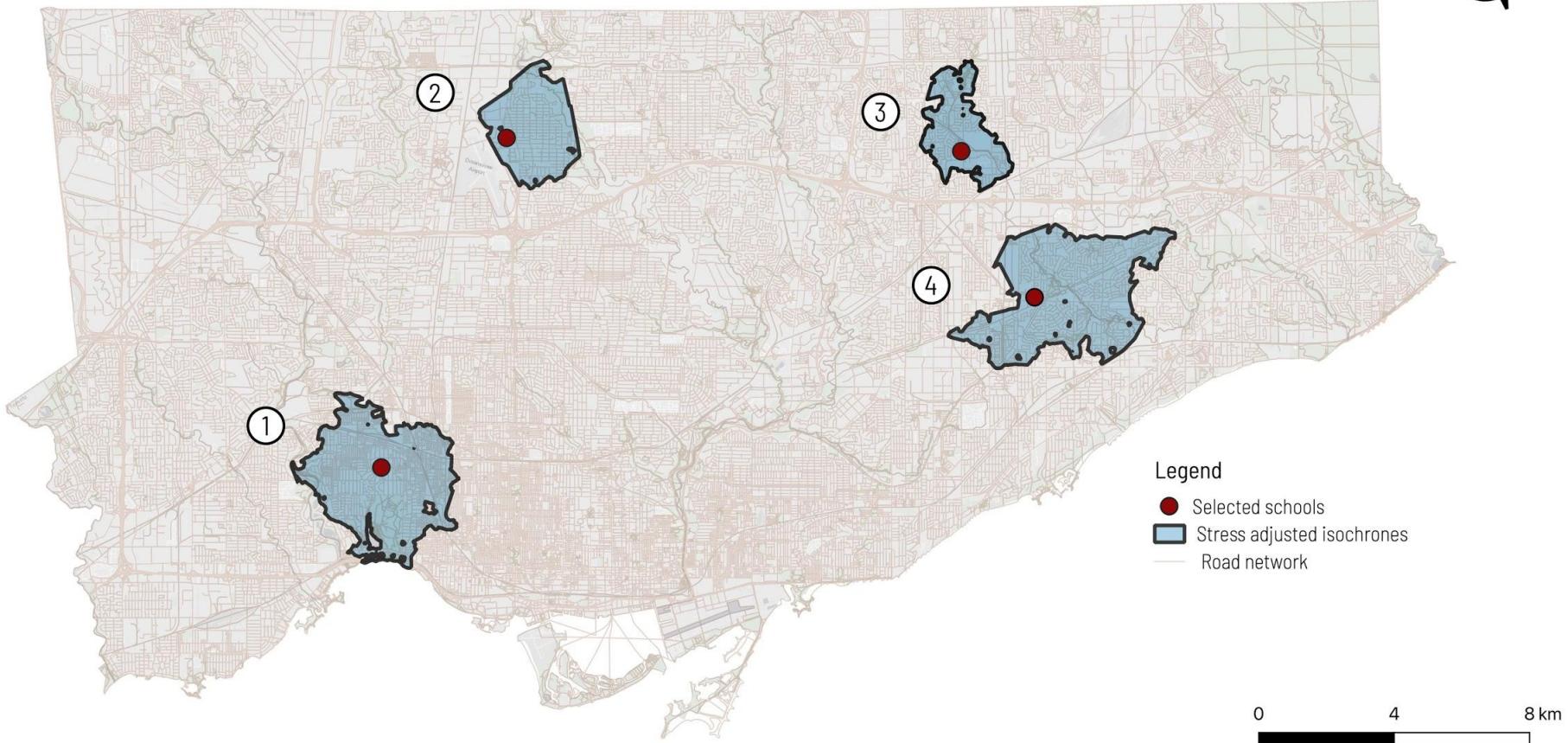


Initial Cycling Isochrones

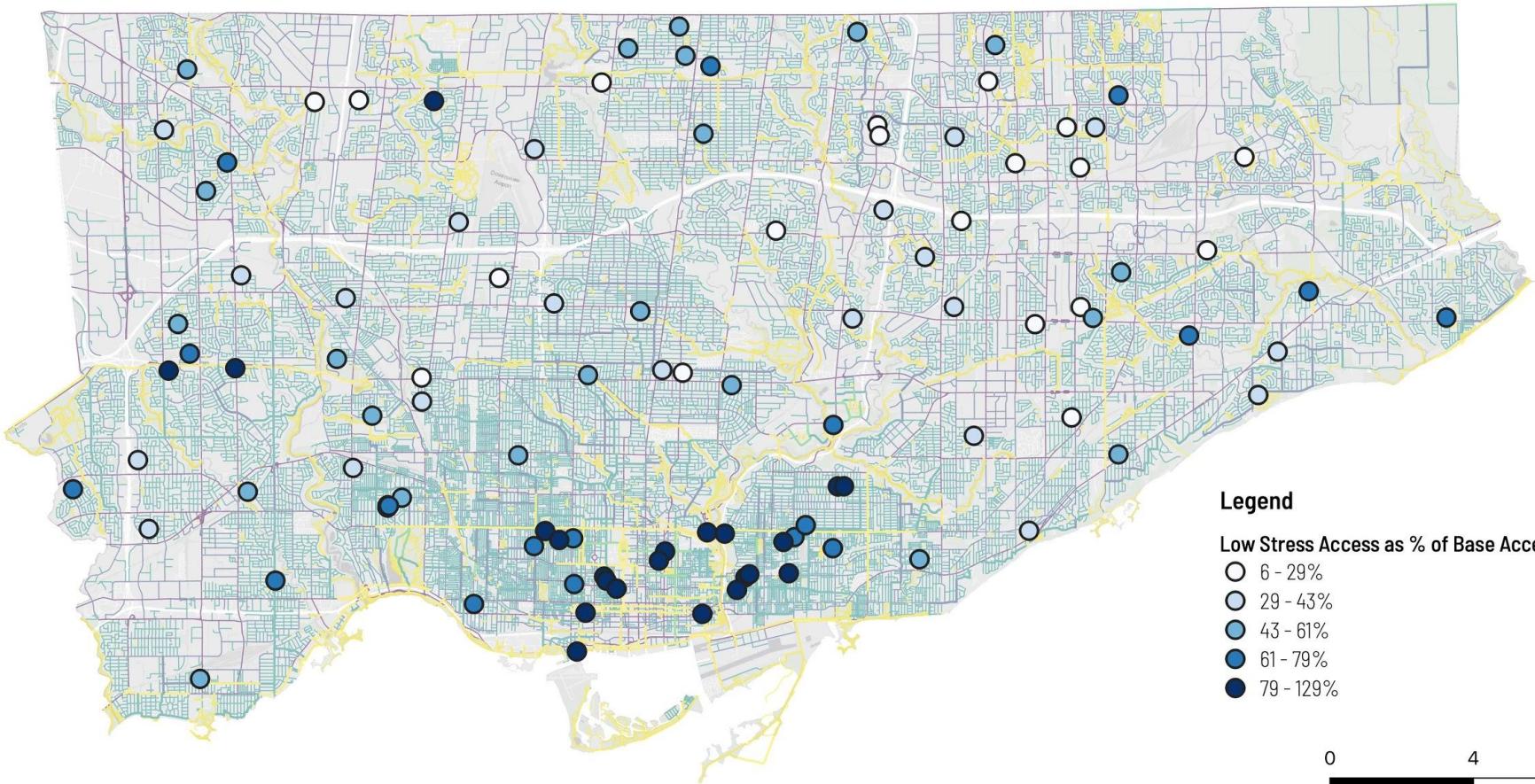




Stress Adjusted Cycling Isochrones

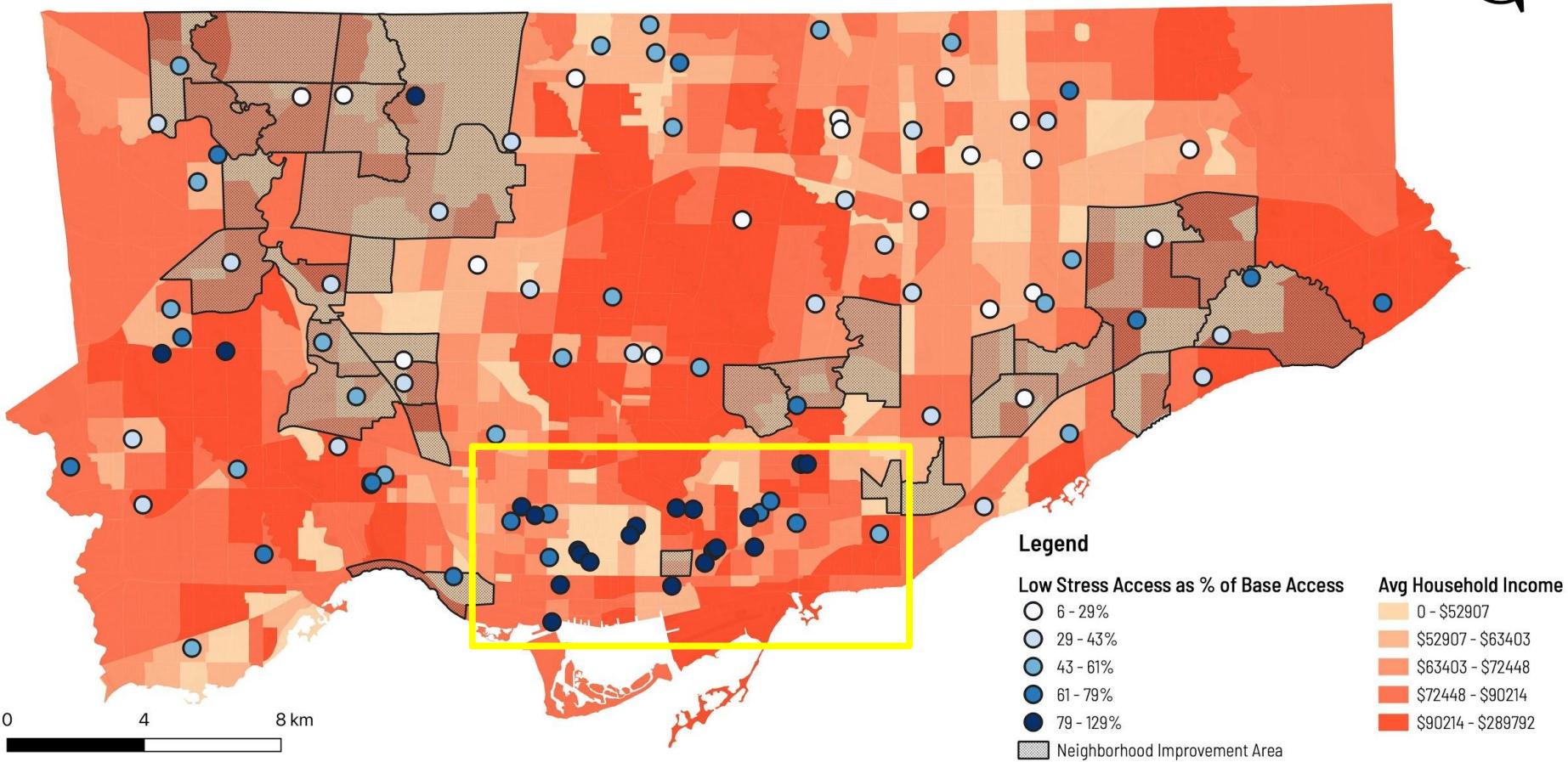


Stress Adjusted Cycling Mobility % per School



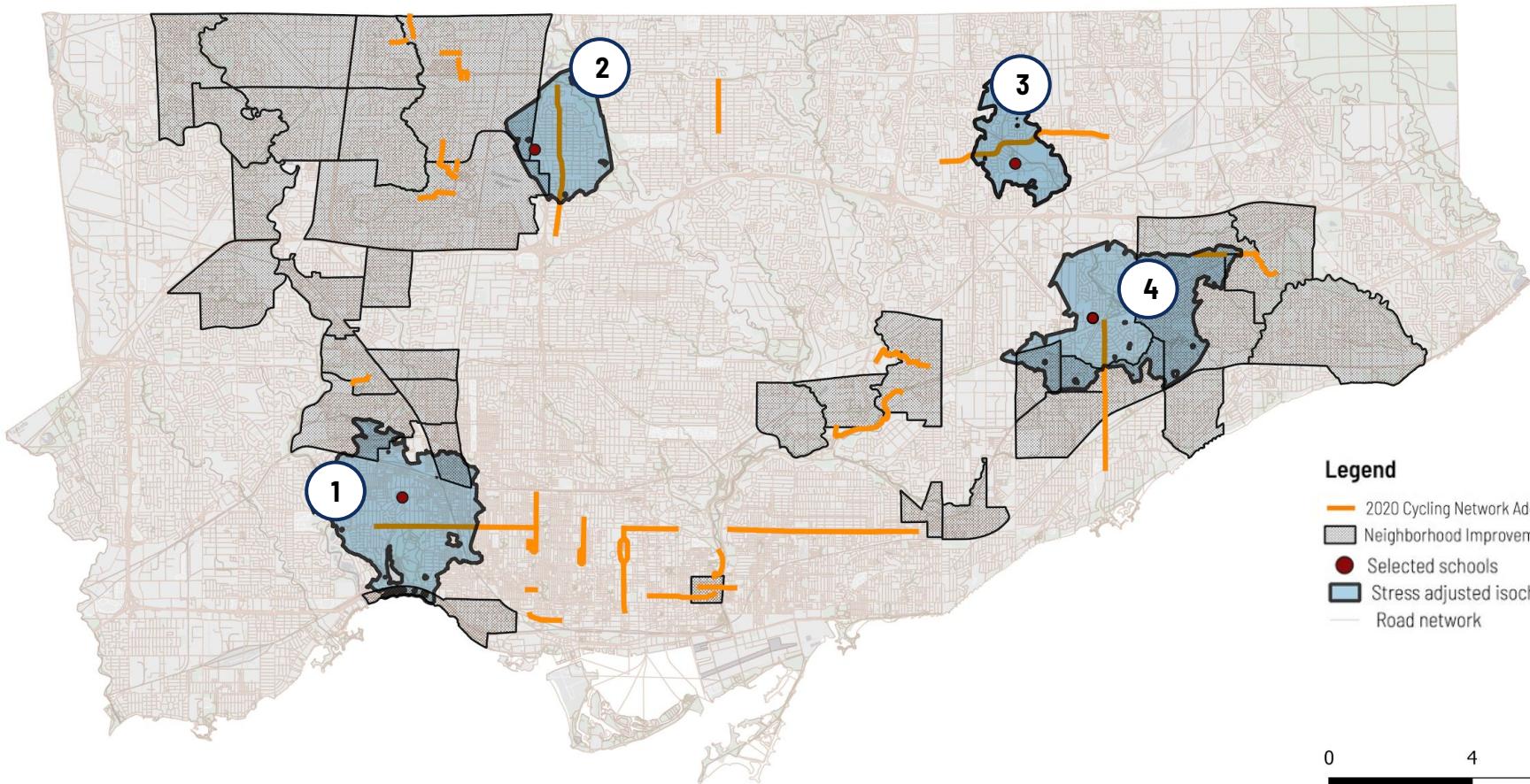


Low stress access concentrated downtown



Schools along 2020
additions saw
big changes to
their stress
adjusted
isochrones





Legend

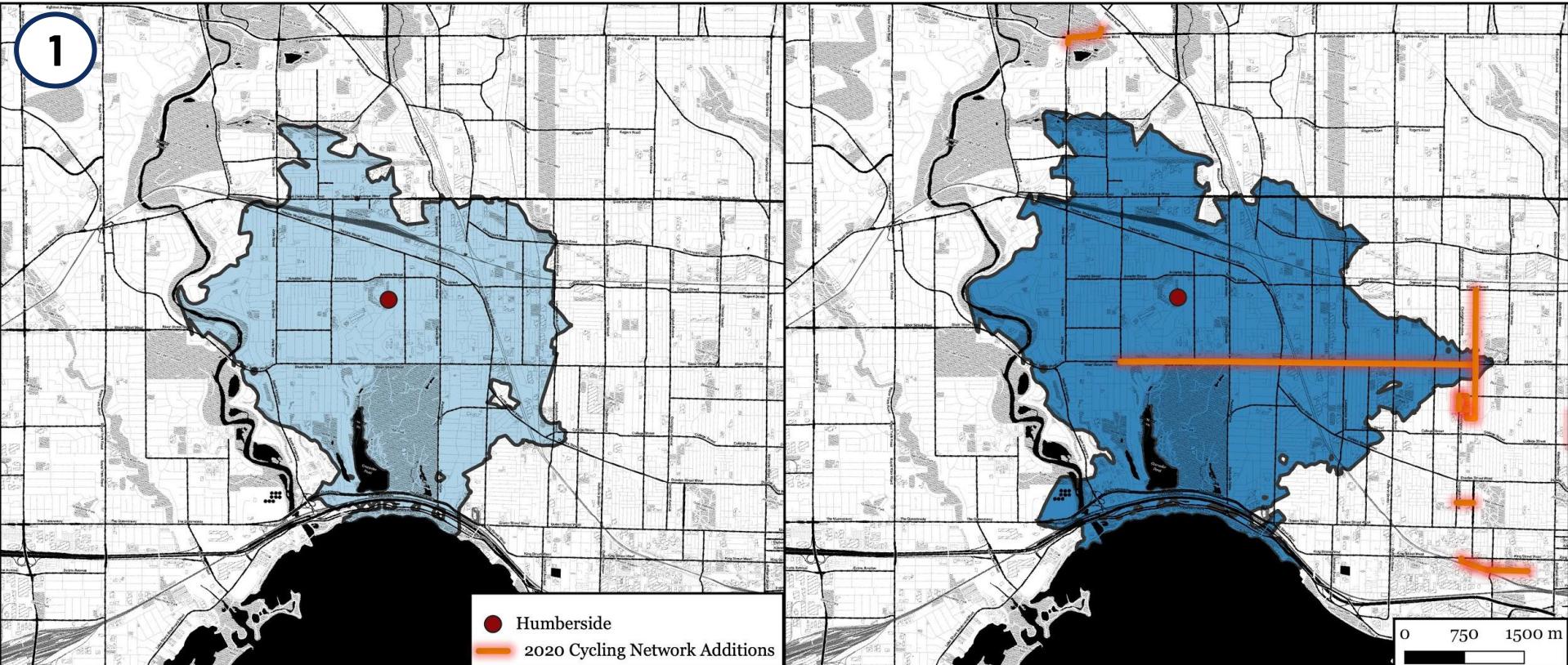
- 2020 Cycling Network Additions
- Neighborhood Improvement Area
- Selected schools
- Stress adjusted isochrones
- Road network

0 4 8 km
0 4 8 km

Bloor Street West (Humberside Collegiate Institute)



1



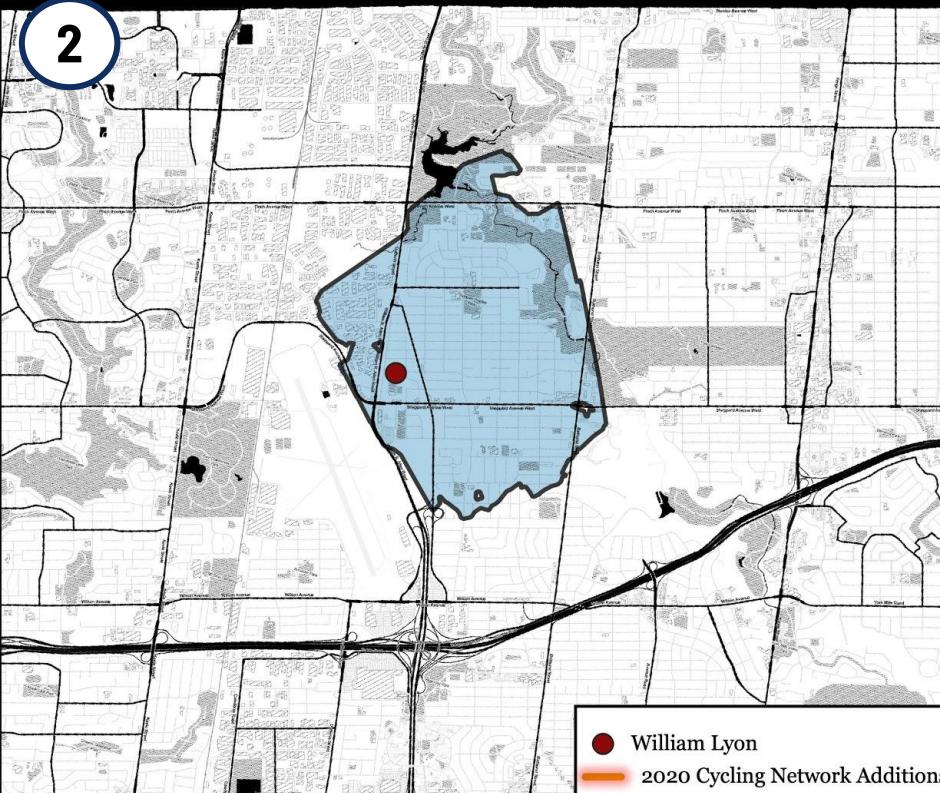
Pre-2020 Cycling Impedimente

Post-2020 Cycling Impedimente

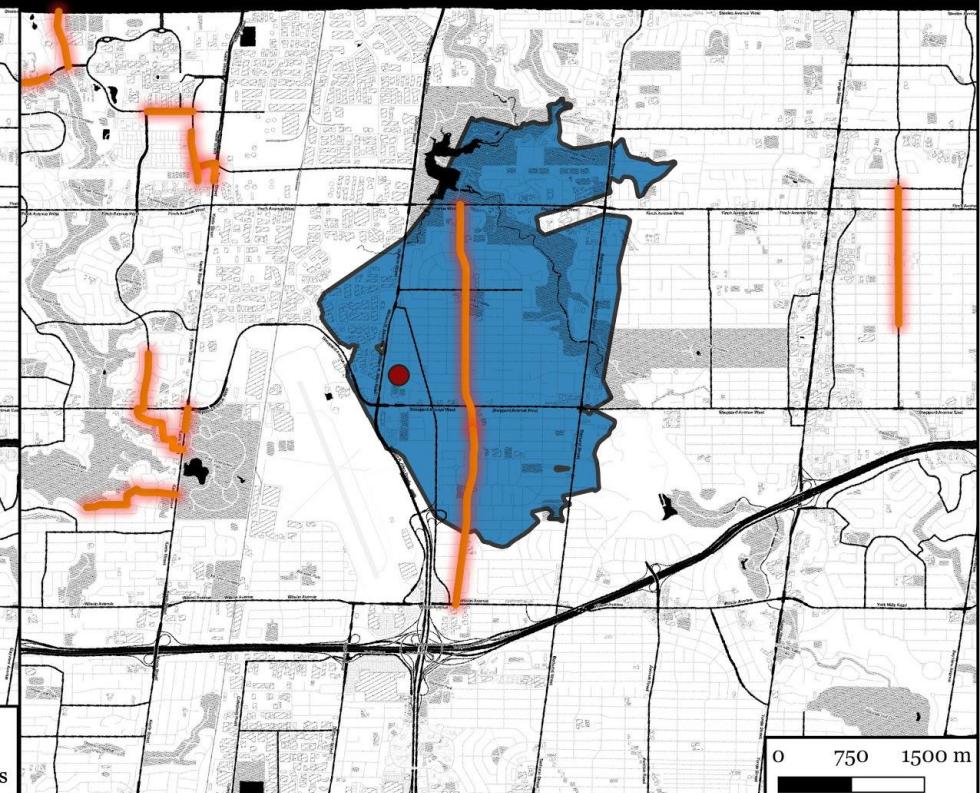
Wilmington (William Lyon Mackenzie Collegiate Institute)



2



Pre-2020 Cycling Impedance

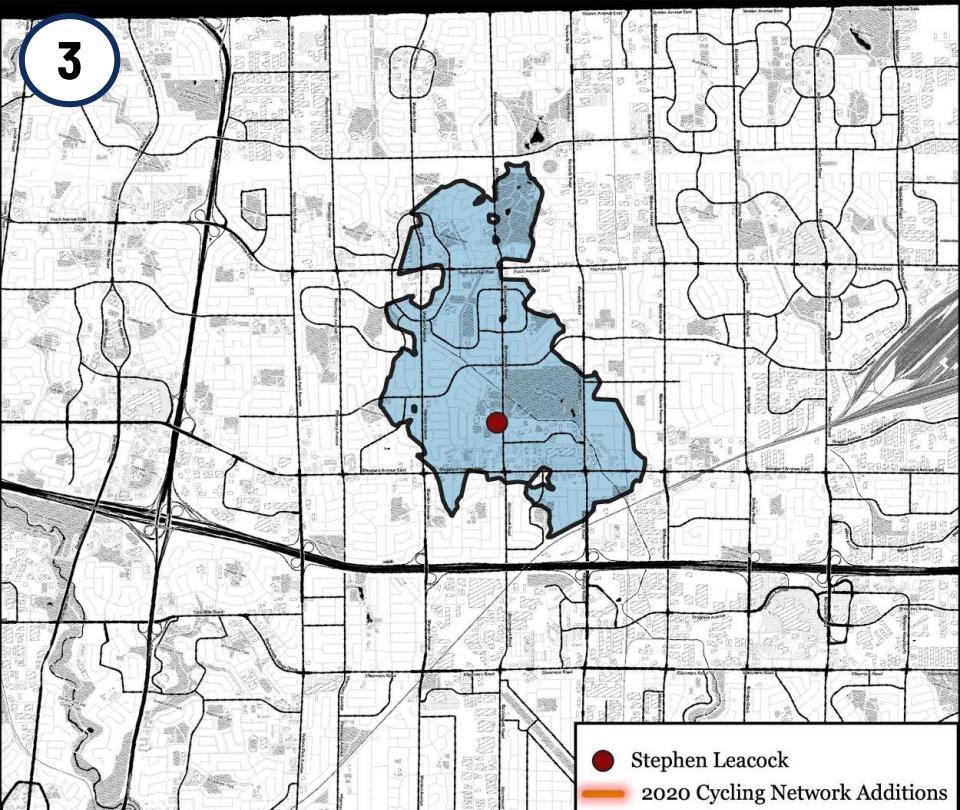


Post-2020 Cycling Impedance

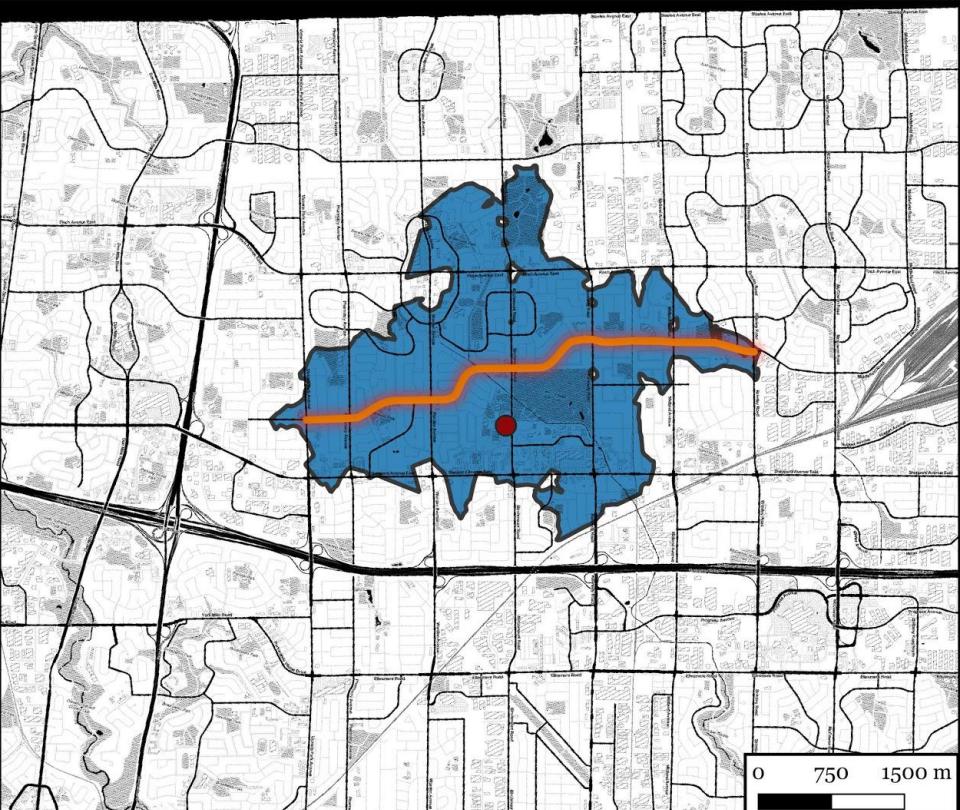
Huntingwood (Stephen Leacock Collegiate Institute)



3



Pre-2020 Cycling Impedance

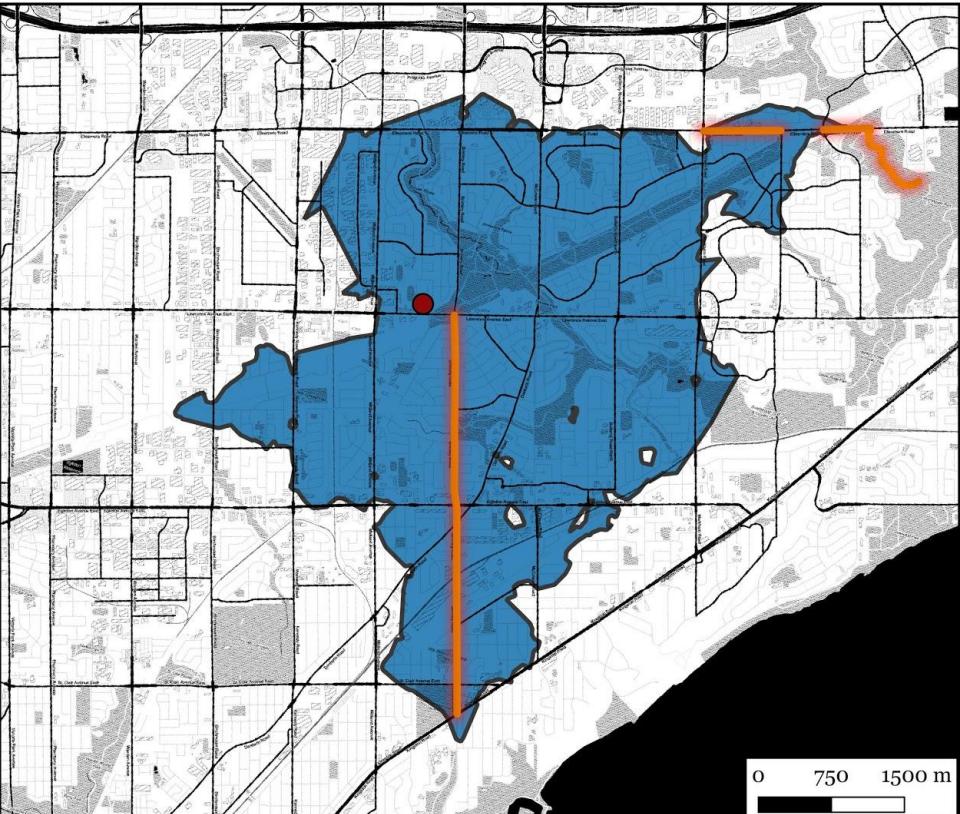
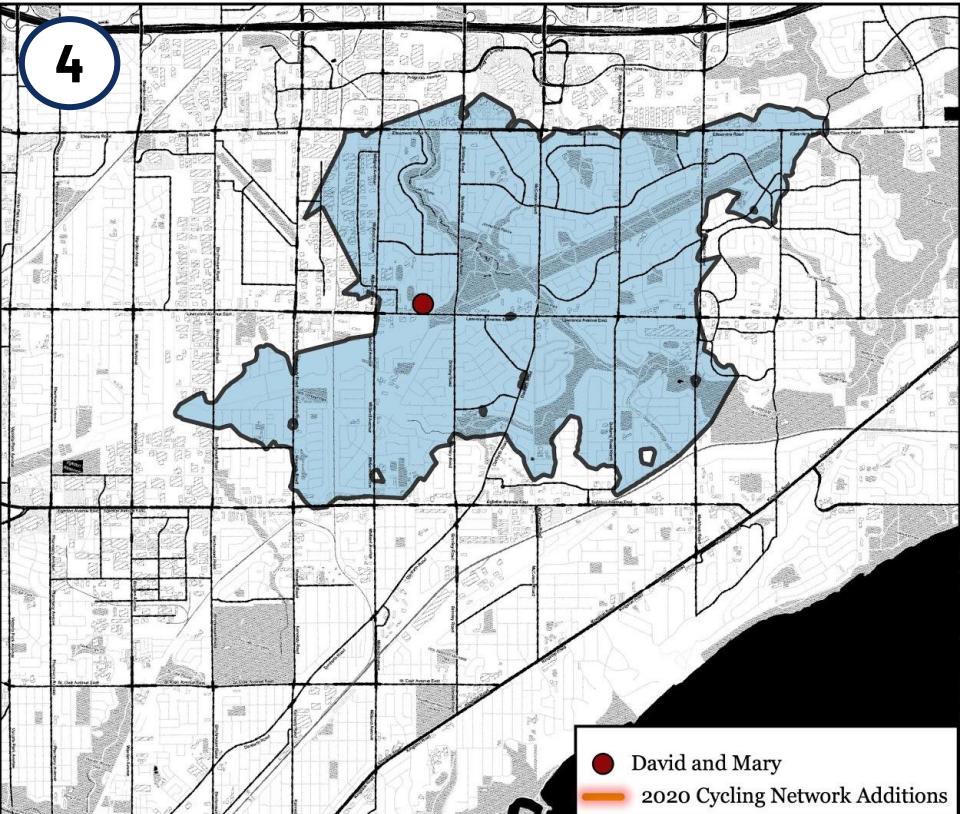


Post-2020 Cycling Impedance

Brimley (David and Mary Thomson Collegiate Institute)

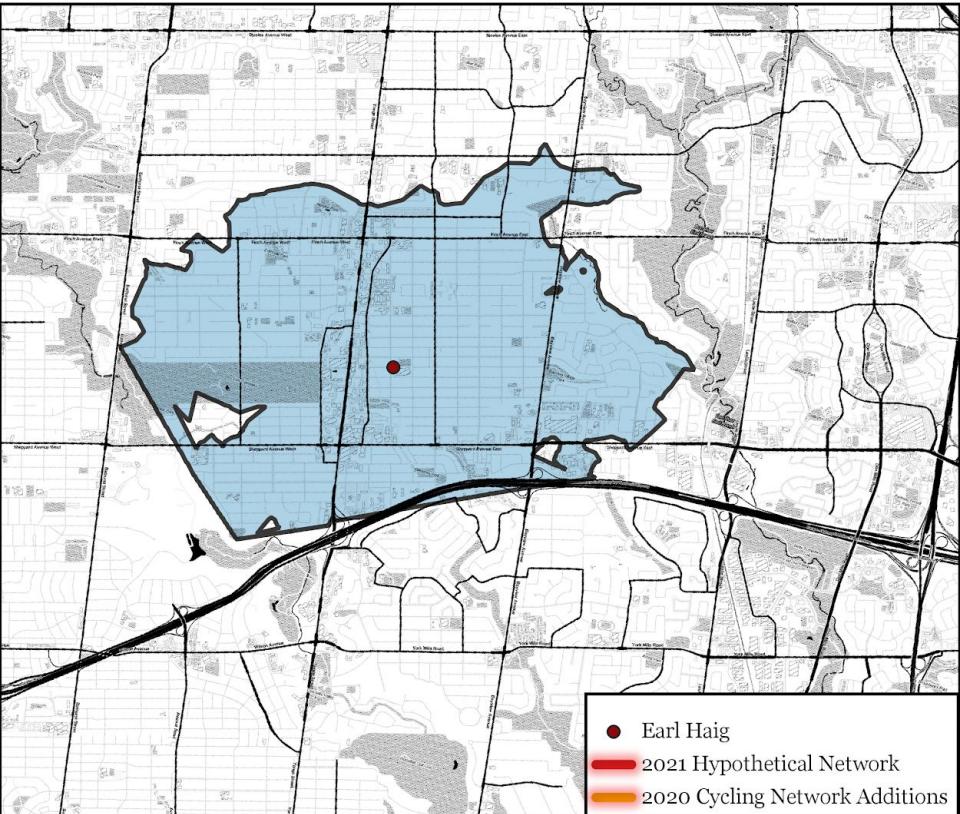


4

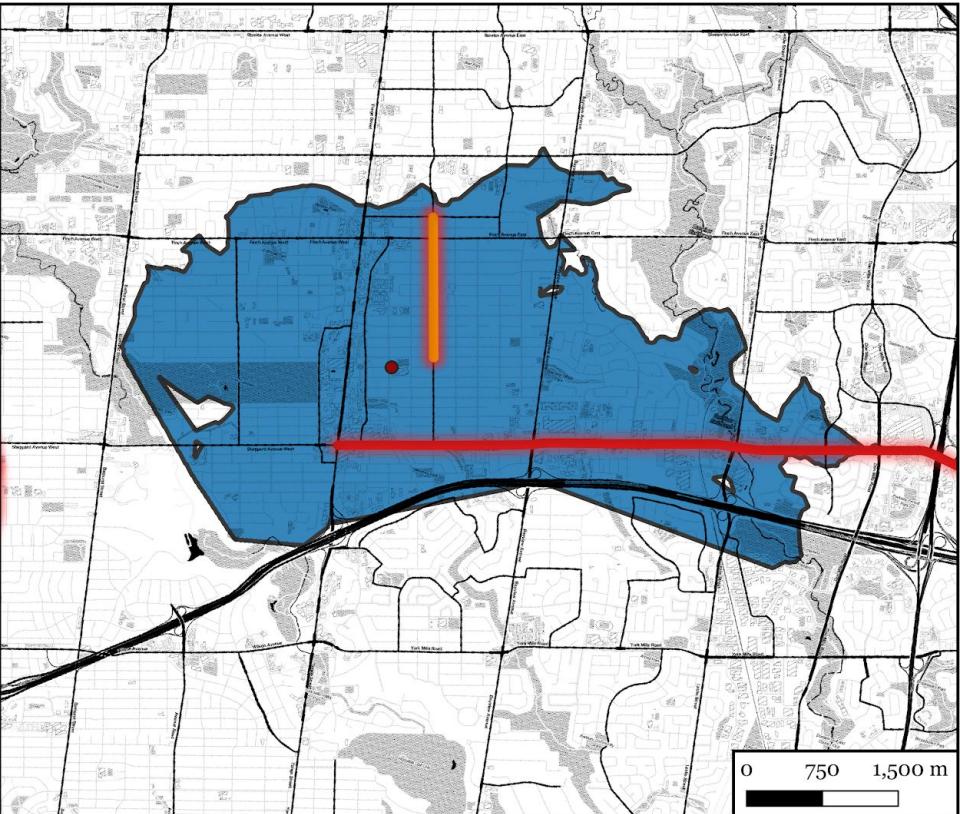


Further Analysis: 2021 Hypothetical Network

Sheppard (Earl Haig Secondary School)



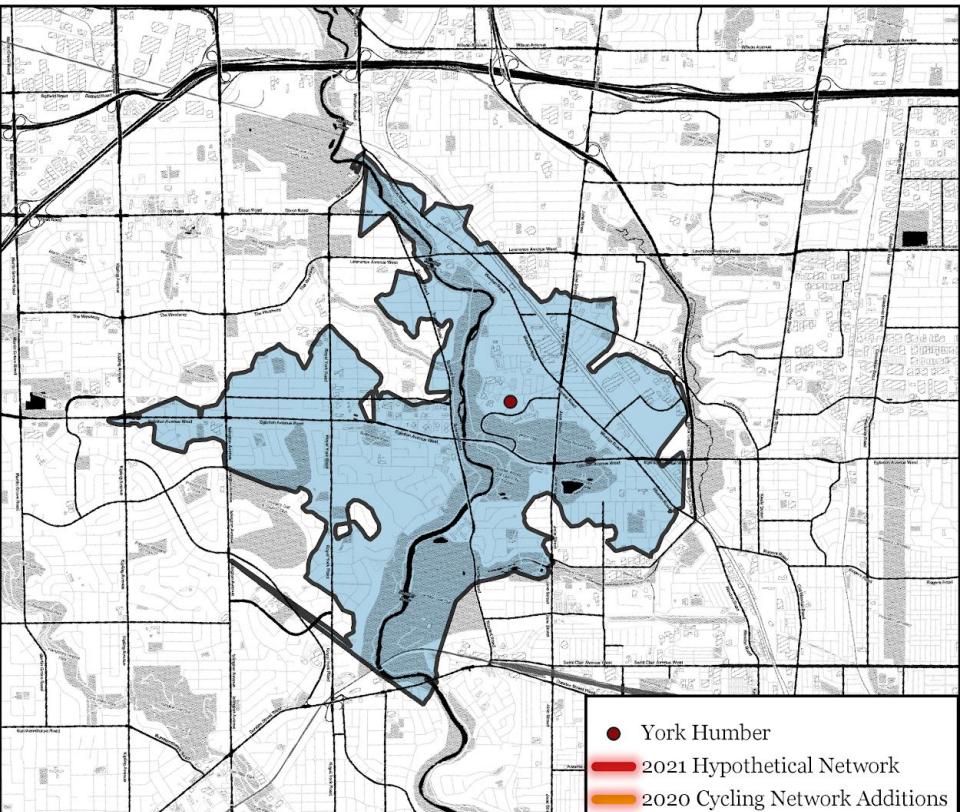
Pre-2020 Cycling Impedance



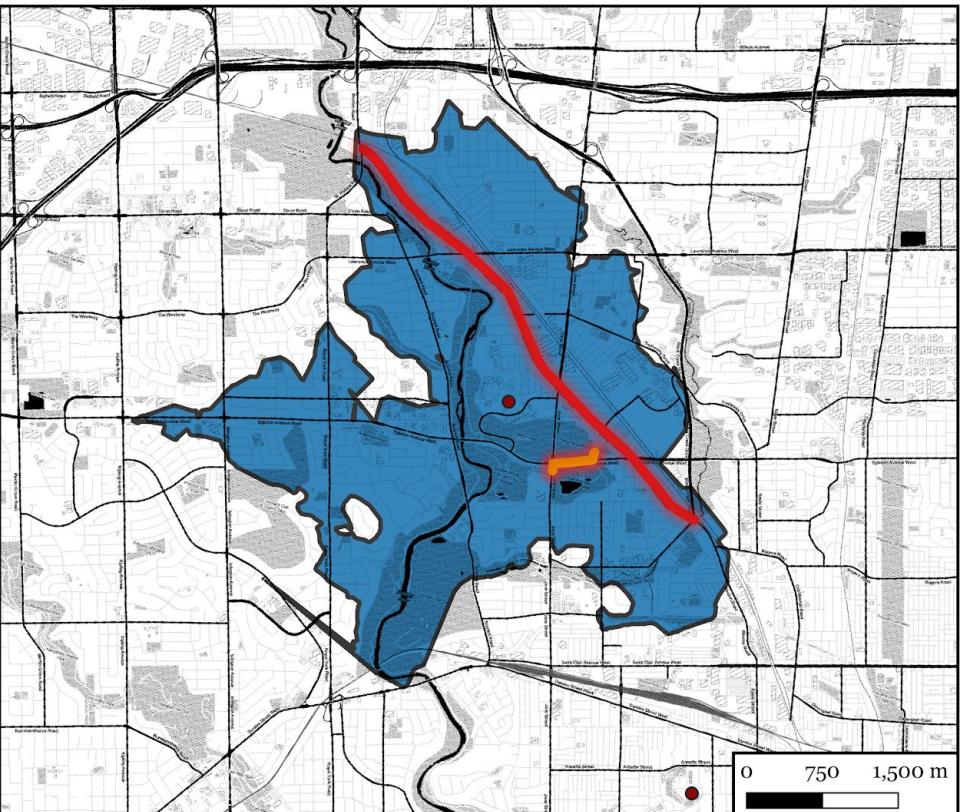
Hypothetical 2021 Cycling Impedance

0 750 1,500 m

Weston (York Humber High School)

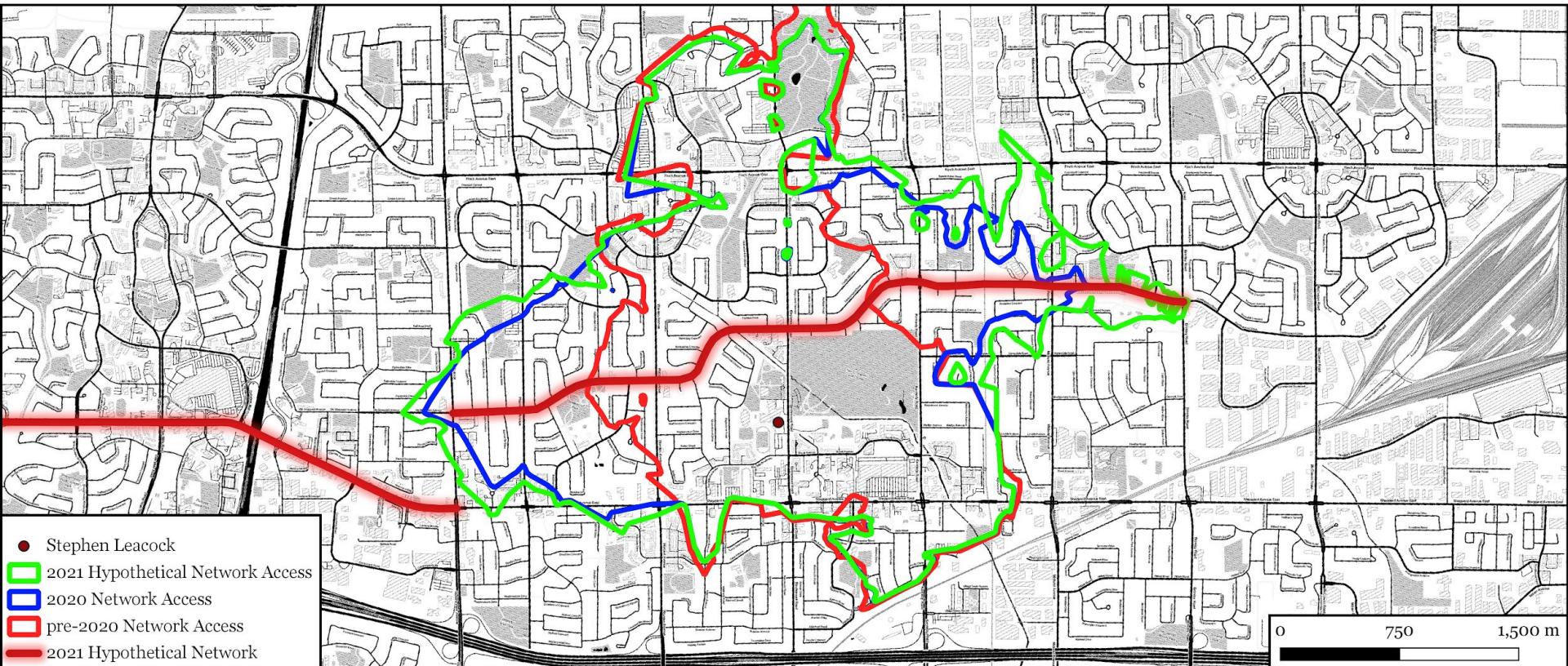


Pre-2020 Cycling Impedance

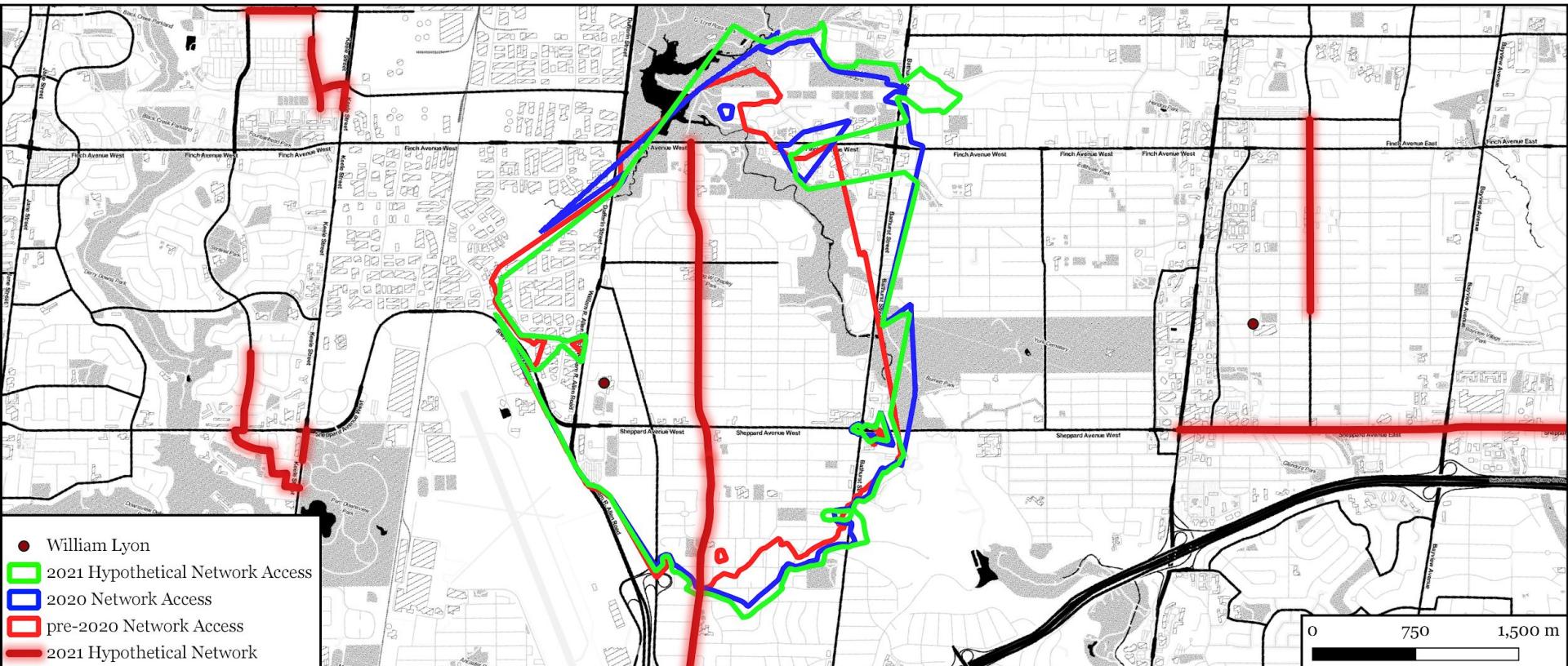


Hypothetical 2021 Cycling Impedance

Huntingwood (Stephen Leacock Collegiate Institute)



Wilmington (William Lyon Mackenzie Collegiate Institute)



KEY FINDINGS

- Clear difference in access between **downtown and inner suburbs**
- **Safe cycling infrastructure** that supports **school-aged children** is important and still missing
- Access improvements from ActiveTO Projects (Bloor St W, Wilmington, Huntingwood, & Brimley)
- Some access improvements were made in **Neighborhood Improvement Areas**



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Data Sources

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* All photos from [Cycle Toronto Instagram page](#) unless otherwise noted