

Building Health Through Planning

The Healthy Development Mapping and Monitoring Project

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Disclosure Statement

- I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.



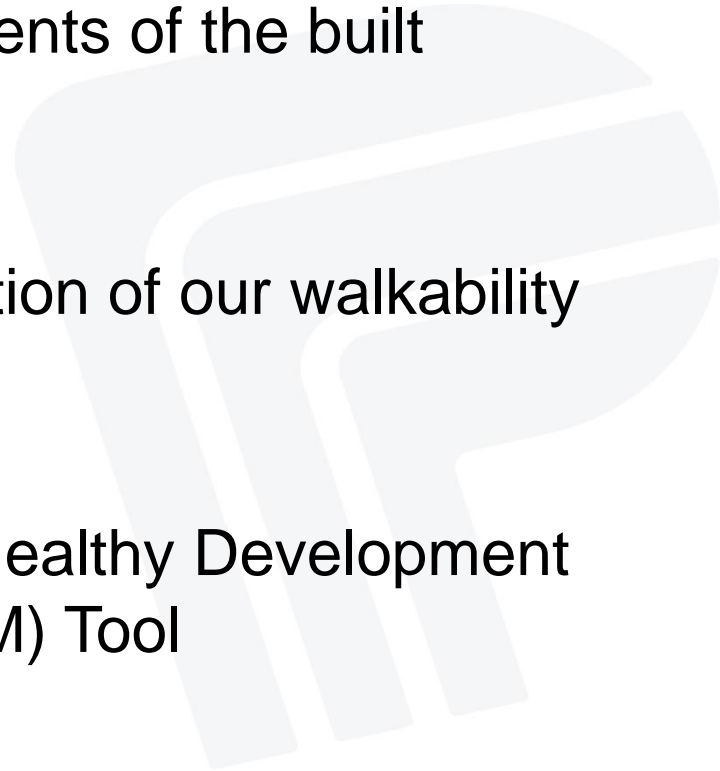
Learn about a multi-sector, collaborative project that measures and monitors the health supportive elements of the built environment

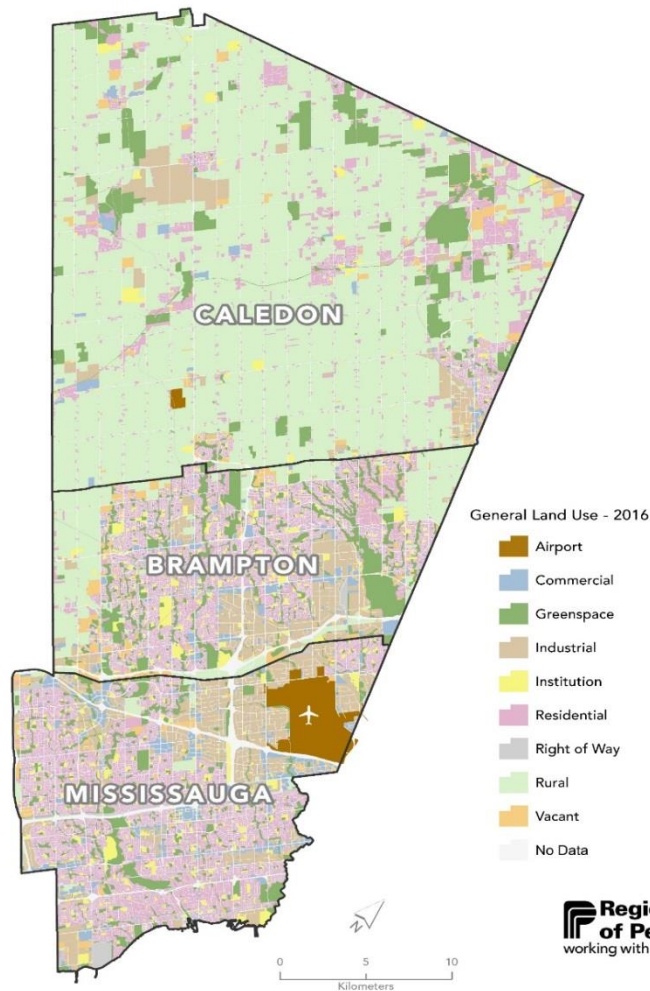


Description of the creation of our walkability index



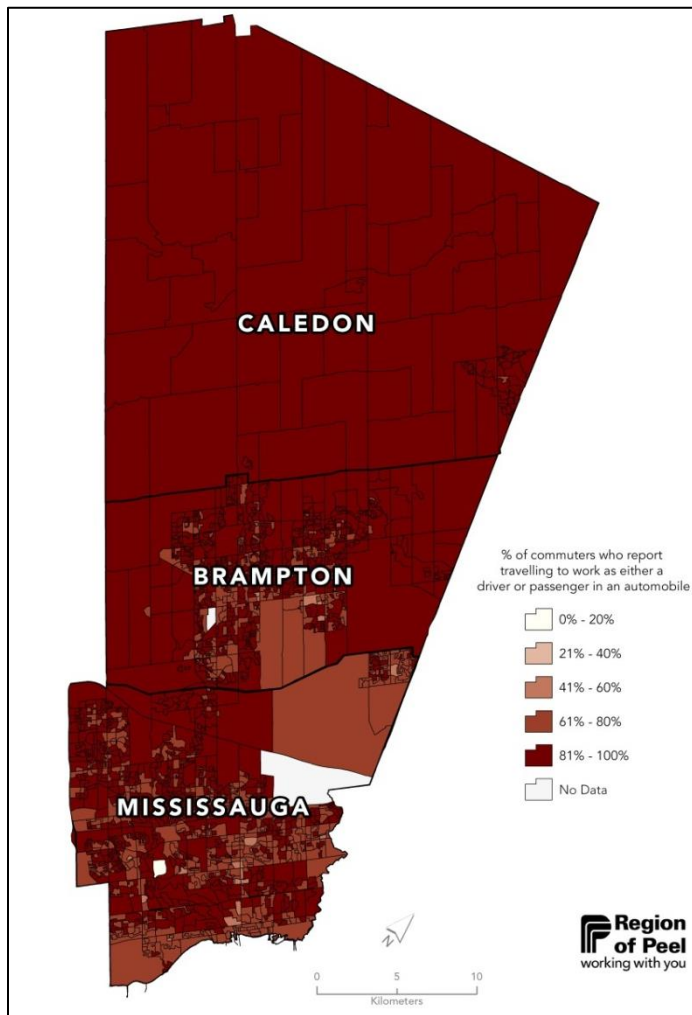
Demonstration of the Healthy Development Monitoring Map (HDMM) Tool



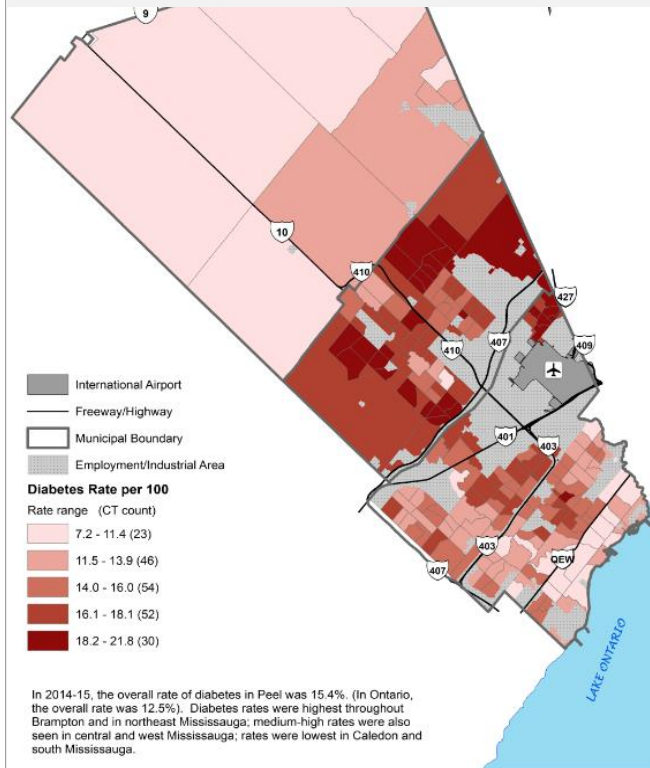


- Population: 1.382 million (2016 census undercount)
- Total geographic area: 1,247 km²
- Three local municipalities: City of Mississauga, City of Brampton and Town of Caledon
- Five 400-series highways
- Mix of urban, suburban and rural
- Dominated by low density, auto-oriented development

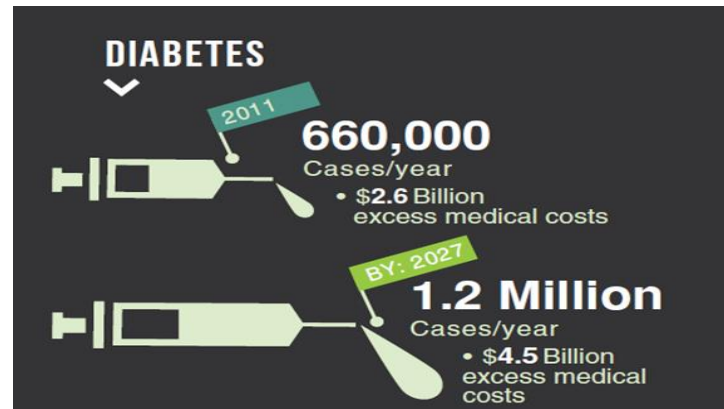
AUTO-DEPENDENT DEVELOPMENT

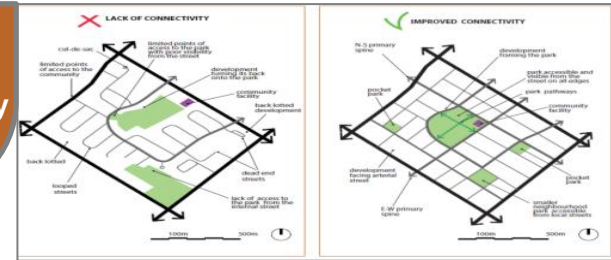
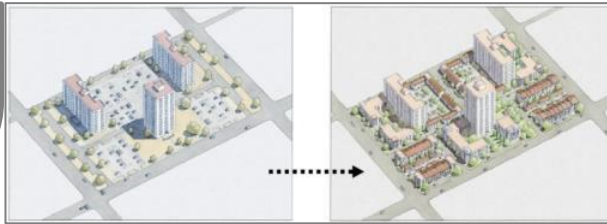


Number of people with diabetes per 100 people over the age of 20 by census tract (age and sex standardized), 2014 - 2015



SOURCE:
Ontario
Diabetes
Database (Age
and sex
standardized)



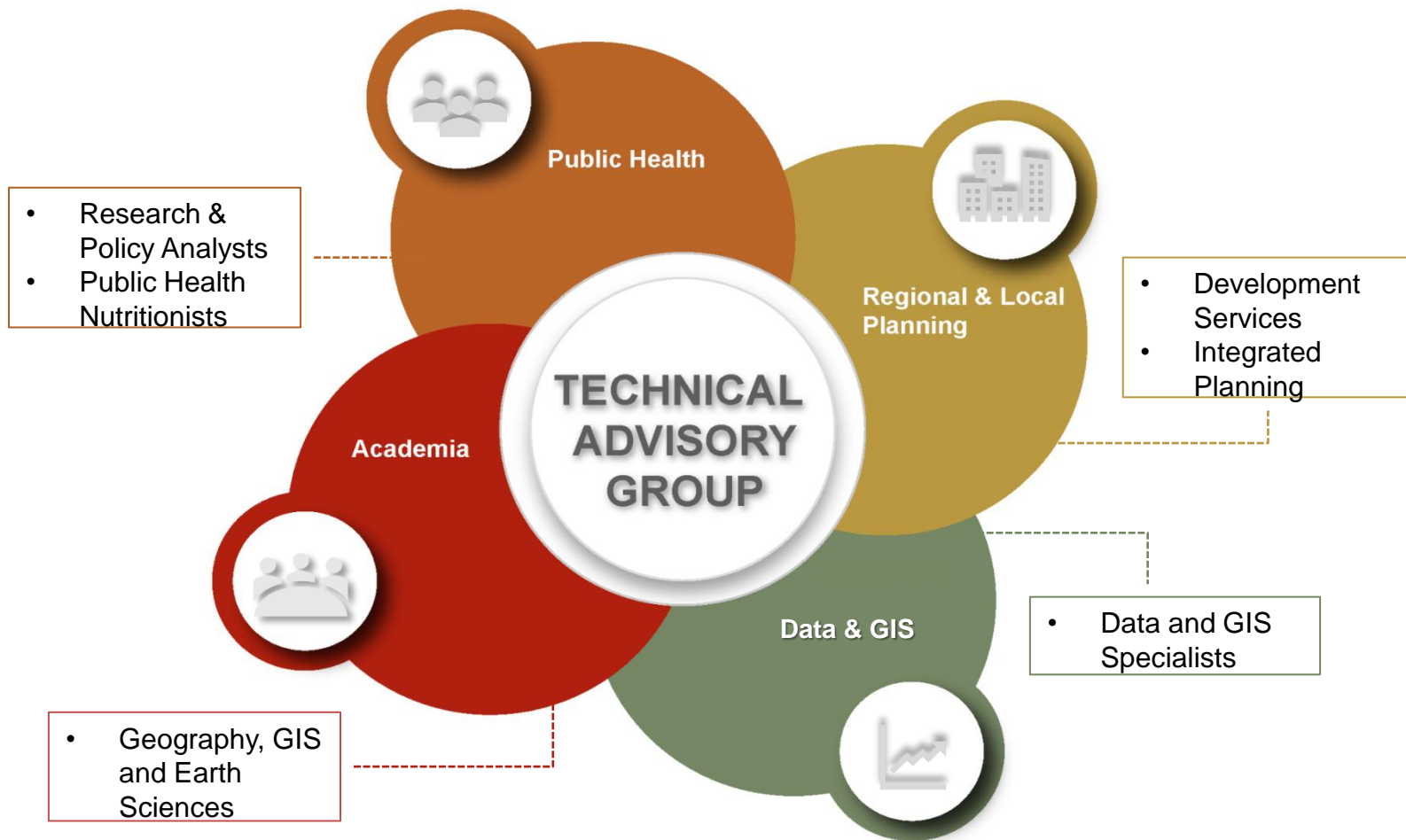


Built Environment Indicators

- Indicators that measure existing built form features according to the six core elements that form municipal health assessment tools
- Measures for all local municipalities

Healthy Development Monitoring Map

- Web map includes all 21 indicators and composite indicator
- Indicators re-run every five years to monitor for changes
- Interactive communication and decision-making tool





Geography

Census
Dissemination
Area (DA)



Preliminary Indicators

Planning, Geography
and Health literature

Province's Growth
Plan Performance
Indicators

Indicator Projects

HDF Metrics

Planning and Health
Department input



TAC Feedback

Preliminary indicators

Technical feedback

Planning and policy
context feedback



Creating Indicators

Database validation

GIS methodology
problem solving

Ground-truthing

INDICATORS

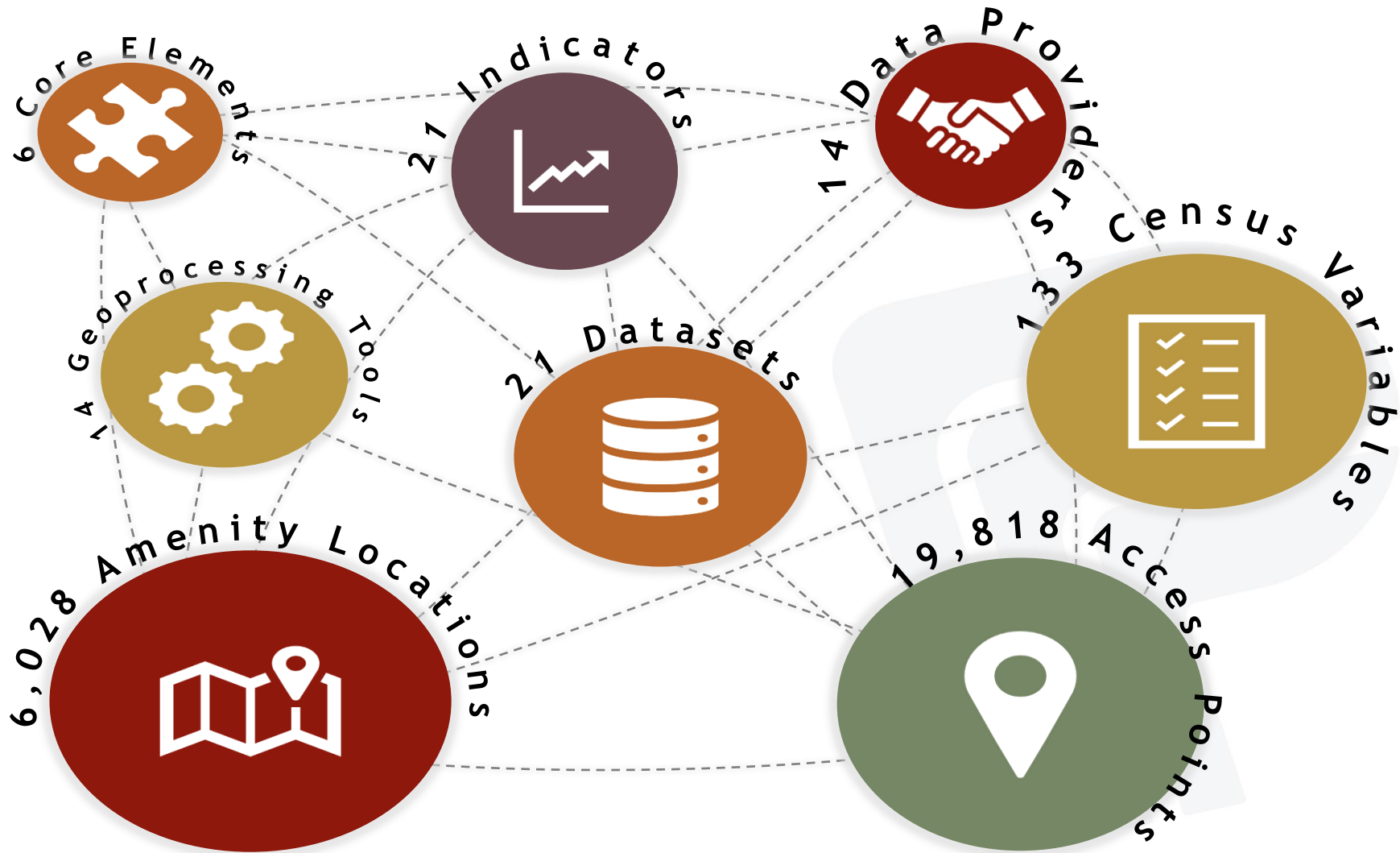
Density	1. Residential Density
	2. Population Density
	3. Employment Density
	4. Population + Employment Density

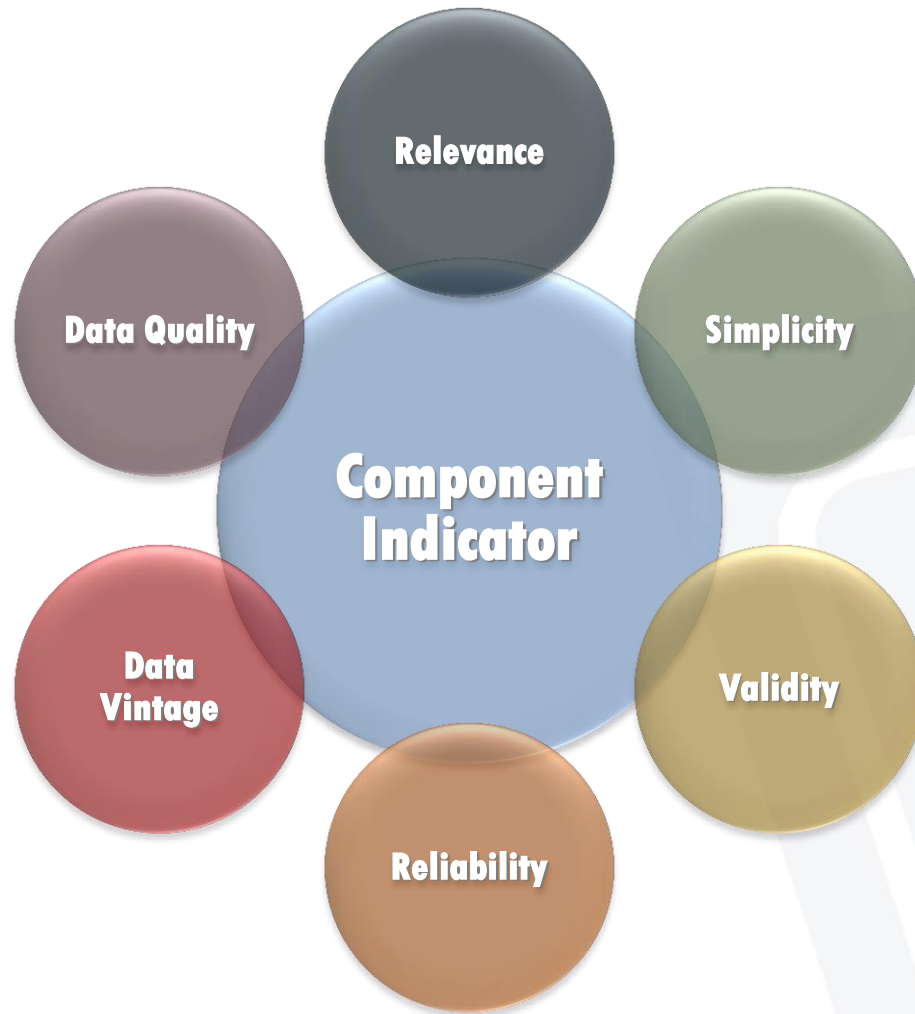
Land Use Mix	11. Diversity of Land Use
	12. Diversity of Housing Stock
	13. Affordable Housing

Service Proximity	5. Proximity of Residents to Transit
	6. Proximity to Natural Features and Parks
	7. Proximity of Residents to Grocery Stores
	8. Proximity of Residents to Schools
	9. Proximity of Residents to Public Community Retail Services
Parking	10. Proximity of Employees to Transit
	21. Efficient Parking

Streetscape Characteristics	16. Street Tree Planting
	17. Proximity of Residents to Network
	18. Proximity of Employees to Network
	19. Traffic Calming
Street Connectivity	20. Transit Stop Design
	14. Intersection Density
Street Connectivity	15. Pedestrian Infrastructure

INDICATORS





INDICATORS

No.	Indicator	Relevance	Simplicity	Validity	Reliability	Data Vintage	Data Quality	Score
1	Residential Density	5.0	5.0	5.0	5.0	5.0	4.5	98%
2	Population Density	5.0	5.0	5.0	5.0	5.0	4.5	98%
3	Employment Density	4.0	5.0	3.5	3.5	3.5	3.5	36%
4	Population + Employment Density	4.0	5.0	3.5	3.5	3.5	3.5	77%
5	Proximity of Residents to Frequent Transit	5.0	4.0	4.0	4.0	5.0	4.0	87%
6	Proximity of Residents to Greenspace	5.0	5.0	4.0	5.0	4.0	4.0	90%
7	Proximity of Residents to Grocery Stores	5.0	5.0	5.0	5.0	5.0	5.0	100%
8	Proximity of Residents to Schools	5.0	5.0	5.0	5.0	5.0	5.0	100%
9	Proximity of Residents to Community & Retail Services	5.0	4.0	5.0	5.0	4.0	4.0	90%
10	Proximity of Employees to Frequent Transit	4.0	4.0	3.5	3.5	3.5	3.5	38%
11	Diversity of Land Use	5.0	5.0	4.0	4.5	5.0	4.5	93%
12	Diversity of Housing Stock	5.0	5.0	4.5	4.5	5.0	4.5	95%
13	Affordable Housing	5.0	5.0	2.5	3.5	4.0	4.0	79%
14	Intersection Density	5.0	2.5	5.0	5.0	5.0	4.0	88%
15	Pedestrian Infrastructure Ratio	3.5	2.5	2.5	2.5	3.5	4.0	61%
16	Street Tree Planting	4.5	4.5	4.0	5.0	2.5	4.0	80%
17	Proximity of Residents to Bicycle Network	4.5	5.0	5.0	5.0	4.0	4.0	92%
18	Proximity of Employees to Bicycle Network	4.5	5.0	5.0	5.0	3.5	4.0	46%
19	Traffic Calming	5.0	3.5	2.5	3.5	4.0	4.0	75%
20	Transit Stop Design	2.5	3.5	5.0	3.5	5.0	4.0	57%
21	Parking Surface within Employment Area	2.5	2.5	3.5	2.5	2.5	3.5	28%



Determinant	0.190
KMO	0.757
Bartlett's	0.000
MSA - Max	0.879
MSA - Min	0.712
Eigenvalue Extraction Threshold	0.950
Number of Components	3.000
Total Variance Explained	62.4%
Non Redundant Residuals	53.0%
Component Matrix – Max	0.411
Component Matrix - Min	0.170

Variables	Component		
	1	2	3
SP_7	0.855		
SP_9	0.855		
LU_11	0.570		
SP_6		0.801	
SP_8		0.748	
DG_1			0.868
LU_12			0.736
SP_5			0.439

1. Proximity to Services



2. Proximity to Parks and Open Space



3. Density and Housing Mix



Composite indicator

DAUID	CSDNAME	DG_1	SP_5	SP_6	SP_7	SP_8	SP_9	LU_11	LU_12	Walk Score	Walkability
35210228	Brampton	0.04	0.94	1.00	0.00	1.00	0.00	0.77	0.20	0.4925	Moderate
35210229	Brampton	0.01	0.49	1.00	0.60	1.00	0.86	0.80	0.52	0.6590	High
35210231	Brampton	0.02	1.00	0.60	0.66	0.55	0.76	0.81	0.34	0.5916	High
35210233	Brampton	0.04	0.00	1.00	0.57	1.00	0.00	0.75	0.31	0.4590	Moderate
35210234	Brampton	0.04	0.99	0.57	0.95	1.00	0.07	0.71	0.24	0.5715	High
35210239	Mississauga	0.01	0.00	1.00	0.00	0.11	0.58	0.95	0.77	0.4269	Moderate
35210240	Mississauga	0.04	0.00	1.00	0.00	0.00	0.00	0.67	0.82	0.3168	Low
35210241	Mississauga	0.04	0.00	1.00	0.00	0.00	0.00	0.79	0.71	0.3172	Low
35210242	Mississauga	0.01	0.00	1.00	0.00	0.00	0.03	0.61	0.28	0.2403	Very Low

$$X_{\text{norm}} = \frac{X - X_{\text{min}}}{X_{\text{max}} - X_{\text{min}}}$$

Walkability Score

$$= ((\text{DG}_1) + (\text{SP}_5) + (\text{SP}_6) + (\text{SP}_7) + (\text{SP}_8) + (\text{SP}_9) + (\text{LU}_{11}) + (\text{LU}_{12})) / 8$$

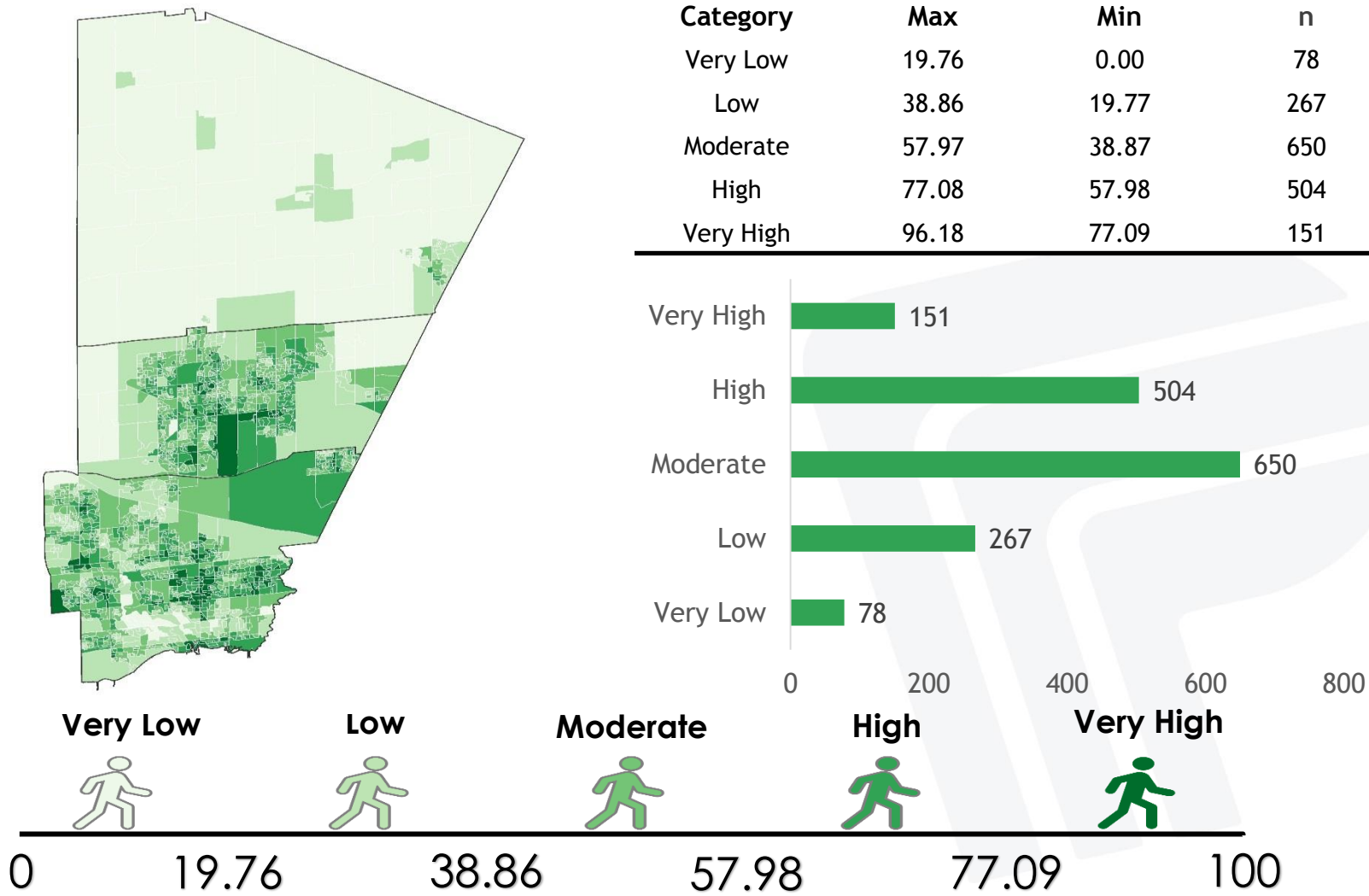
Maximum Walkability Score = 96.18

Minimum Walkability Score = 0.01

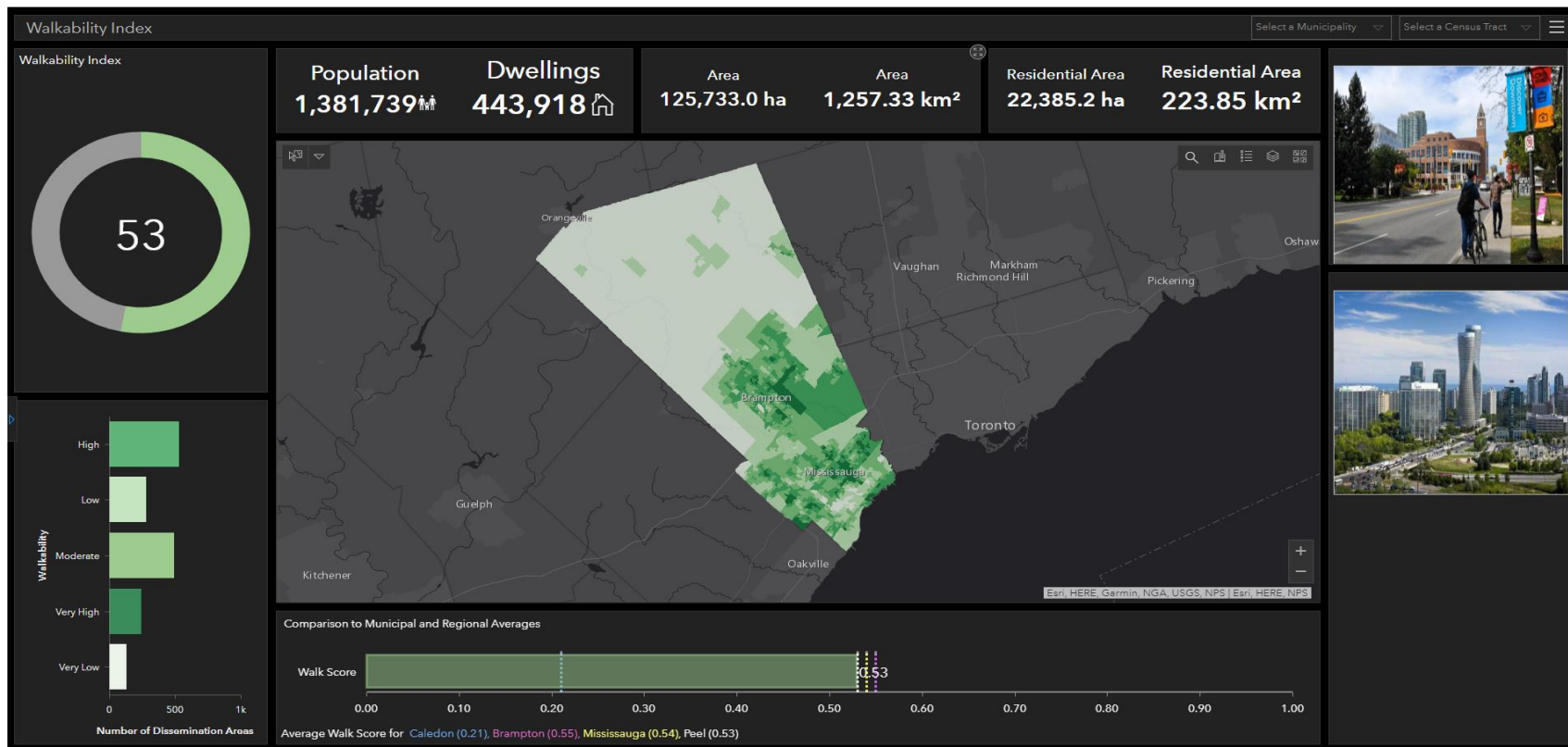
Maximum Theoretical Score = 100

Minimum Theoretical Score = 0

WALKABILITY INDEX



Composite Score and Web App





healthypeelbydesign.ca

 **Region
of Peel**
working with you

