Health-Enhanced Land Use Planning Tool

Developed by Urban Design 4 Health– Larry Frank, Jim Chapman and Suzanne Kershaw in collaboration with Monica Campbell (TPH)

Presented by Kelly Drew, Toronto Public Health

The Role of Health Impact Assessments - Successful collaborations between Public Health and Planners

Fredericton People Matter CIP/API Conference

Healthy Canada by Design

July 10, 2014

CLASP
COALITIONS LINKING ACTION
& SCIENCE FOR PREVENTION

An initiative of:
CANADIAN PARTNERSHIP
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HEALTHYCANADA
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- Developed by UD4H and TPH as part of CLASP

- A GIS based analytical tool

- Scenario evaluation decision support tool

- Uses statistical relationships between built environment features and health

Relationships between built environment and health-related factors

Health –related parameter	Built environment feature
Body Mass Index (BMI)	*Walkability*
Energy Expenditure	*Density*
Walking for Exercise/Leisure	*Access to parks and trails*
Walking/cycling to Work/School	*Walkability and cycling facilities*
Biking Trips to work/school or for Exercise/Leisure	*Residential density and walkability*
High Blood Pressure	*Monthly frequency of walking and cycling trips*

- Toronto data was used to derive statistical relationships
- These relationships were corrected for demographic factors
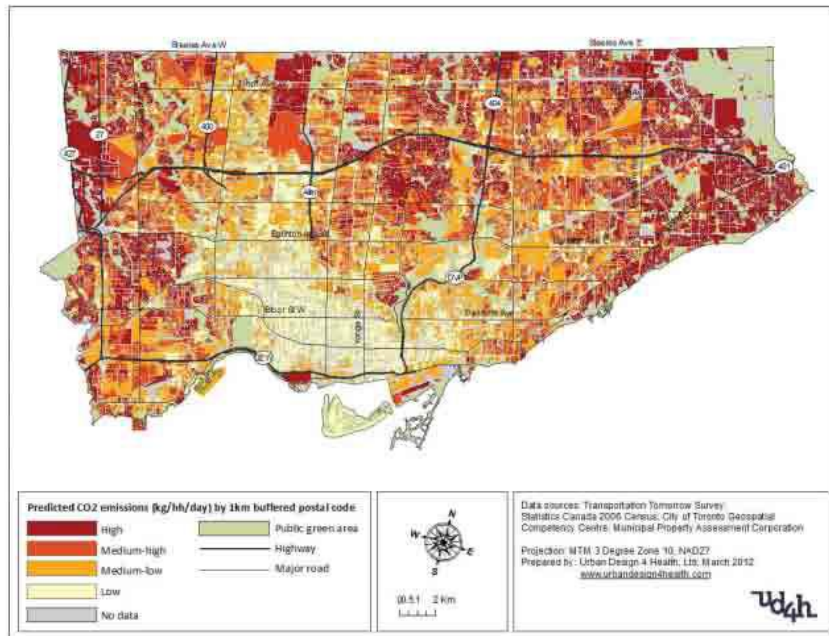- The results of this analysis were programmed into CommunityViz

- Road network
- Schools
- Transit
- Distance to parks; park area
- Food Locations
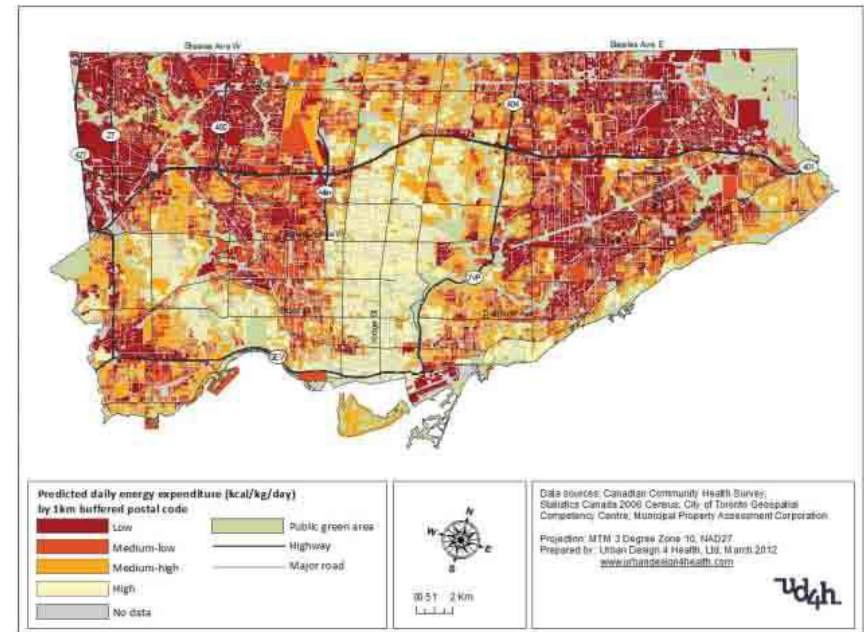- Residential density
- Retail/Office floor to land area ratio

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- Complex relationship between health and the built form
- Density, Land Use, Connectivity and supportive infrastructure are all factors
- Research supports these relationships
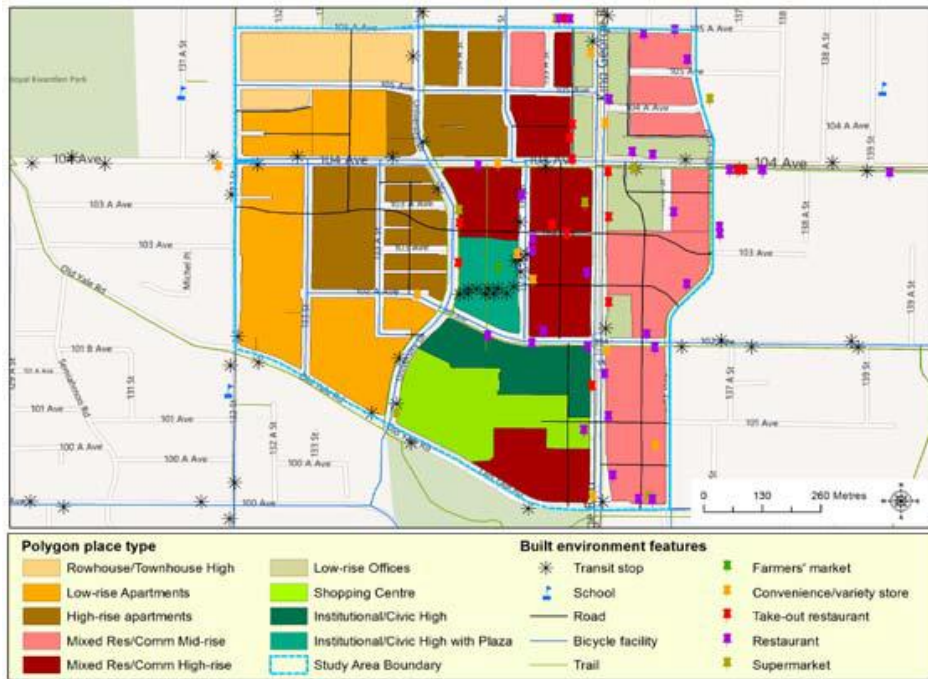- Personal behviour can be influenced by supportive built environments

CO_2 Emissions(Kg/Household/Day)

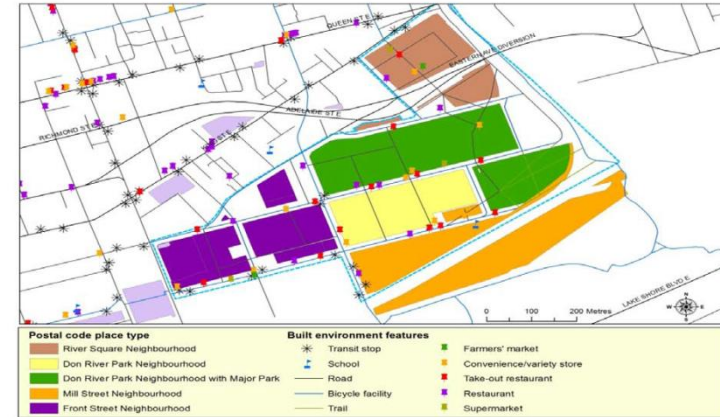Daily Energy Expenditure (Kcal/Kg/Day/Person)

Polygon place type

Rowhouse/Townhouse High	
Low-rise Apartments	
High-rise apartments	
Mixed Res/Comm Mid-rise	
Mixed Res/Comm High-rise	
Low-rise Offices	
Shopping Centre	
Institutional/Civic High	
Institutional/Civic High with Plaza	
Study Area Boundary	

Built environment features

Transit stop
School
Road
Bicycle facility
Trail
Farmers' market
Convenience/variety store
Take-out restaurant
Restaurant
Supermarket

• **CommunityViz Analysis Template was pilot tested on**

  – the redevelopment proposal for the West Don Lands area in Toronto, and

  – development plan for the Surrey Central Station in the City of Surrey, B.C.
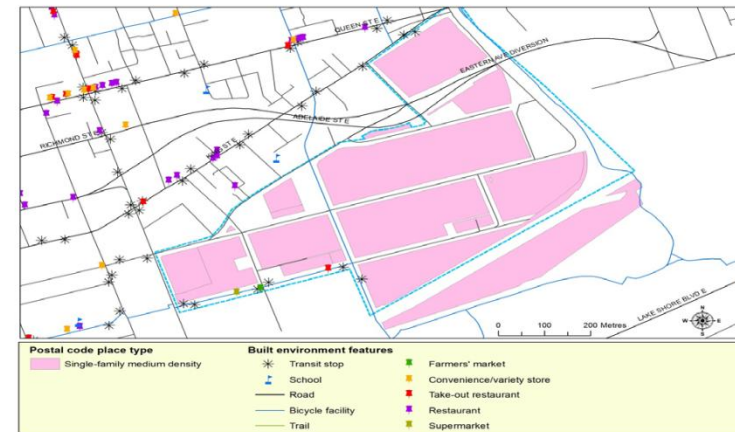
West Don Lands Study example

- Revitalize Toronto's waterfront 80 acre West Don Land site including:
  - 6,000- 6,500 housing units
  - 1,300 of which will be affordable rental housing
  - Residences in a mix of housing types
  - 1 million square feet of office and retail space
  - New streets
  - New parks
  - A new streetcar line
  - A new school.

Scenario 1 – High Density

Scenario 2 – Medium Density

Scenarios

Table 6: West Don Lands Scenario Summary							
Variables	**Existing Conditions**		**Scenario 1: Plan**		**Scenario 2: Medium Density**		**City-wide Average**
	Postal codes (n=15)	**Buffered postal codes (n=15)**	**Postal codes (n=15)**	**Buffered postal codes (n=15)**	**Postal codes (n=15)**	**Buffered postal codes (n=15)**	**Buffered postal codes (n=43,091)**
Net residential density (units per residential acres)	282	72.4	221	119.0	6.0	36.8	23.8
Land use mix (0-1)	0	0.5		0.5	0	0.5	0.3
Retail floor area ratio	0	0.8	1.7	1.2	0	0.8	0.4
Intersection density (count/sq km)	67.5	134.8	175	152.0	67.5	134.8	85.0
Transit density (count/sq km)	17.5	40.4	27.5	42.0	17.5	40.4	30.1
Number of intersections	27	337	70	380	27	337	Since these are not averages, city level values are not provided
Number of transit stops	7	101	11	105	7	101	
Pedestrian-accessible roads (km)	5.7	58.4	9.5	62.2	5.7	58.4	
Bicycle Facilities (km)	1.5	11.8	8.2	18.5	1.5	11.8	
Trails (km)	0.7	4.8	1.5	2.3	0.7	4.8	
Schools	0	12	1	13	0	12	
Food locations	3	159	37	193	3	159	

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- High density (S1) offered the greatest estimated positive outcomes

- Medium density (S2) had poorer health and environment outcomes than existing scenario

- Low density (S3) poorest outcomes of the three scenarios, with the exception of likelihood of high blood pressure

- Significant benefits to health and environment related factors were demonstrated in both Vancouver and Toronto

- Demonstrated that tool could be used in Canadian urban settings

- Template reusable for other cites but city specific data is required

- Useful at:
  - Secondary plan level
  - Block plan level
  - Planning proposals where an increase in density is envisaged
- Currently TPH is evaluating the health benefits of the new transit line and associated development along Eglinton Avenue

- Impact of Road design (with additional data)
- Transit or Cycle development (with additional data)
- Expanded Geography for base data
- Detailed Trip data
- Expanded Built Environment Variables
- Expanded Health Outcomes
- Validate tool in other regions
- Monetization of Changes in Health Outcomes

- Requires

    - a GIS specialist and high-capacity computer

- Tool applicable to large areas (e.g. secondary plans)

- Requires making assumptions on many land-use characteristics

- Most useful when modelling density and land use change

- Buy-in is required from city planning staff

A Healthy Toronto By Design Report

A Health and Environment Enhanced Land Use Planning Tool – Highlights

April 2013

416.338.7600   toronto.ca/health | TORONTO Public Health

To view overview report on the project:

http://www1.toronto.ca/city_of_toronto/toronto_public_health/
healthy_public_policy/hphe/files/pdf/clasp_tool_2012.pdf

And full report:

http://www1.toronto.ca/city_of_toronto/toronto_public_health/
healthy_public_policy/hphe/files/pdf/clasp_2012.pdf

Thanks to UD4H, Kim Perrotta and the Heart and Stroke Foundation

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www.toronto.ca/health

Table 7: Estimated Outcome Values for West Don Lands, Unit Level

Travel, Health- & Climate- Related Outcomes	West Don Lands Existing Conditions	Change Scenario 1: West Don Lands Plan	Change Scenario 2: West Don Lands Medium Density	Scenario 3: Low Density Study Area	City Level Average
average active trips/person/day	0.23	0.48	0.17	0.05	0.14
average transit trips/person/day	0.60	0.79	0.51	0.32	0.49
average automobile trips/person/day	1.00	0.52	1.20	2.31	1.33
average trip kilometers/person/day	18.17	15.43	20.02	29.19	22.58
average CO2 generated from vehicles (kg/HH/day)	3.38	2.39	4.28	5.92	4.21
walking for exercise monthly freq.	14.25	15.57	13.66	9.52	10.12
walk to work/school monthly freq.	7.79	10.94	7.57	2.24	5.58
bicycle for exercise monthly freq.	1.08	1.53	0.93	0.49	0.63
bicycle to work/school monthly freq.	0.80	2.71	0.74	0.05	0.25
daily energy expenditure (kcal/kg/day)	2.28	2.73	2.02	2.29	2.04
body mass index	24.31	24.14	24.36	24.51	24.64
high blood pressure (likelihood)	9.58%	9.11%	9.66%	7.82%	7.38%

Table 8: Estimated Outcome Values for West Don Lands, Population-Level

Outcome	Existing Conditions	Change Scenario 1	Change Scenario 2
Population	202	13,474	1,307
active trips/day	47	6,486	223
transit trips/day	121	10,663	661
automobile trips/day	201	7,062	1,566
trip kilometers/day	3,663	207,873	26,166
walking for exercise (times/month)	2,874	209,733	17,853
walk to work/school (times/month)	1,571	147,369	9,893
bicycle for exercise (times/month)	218	20,613	1,218
bicycle to work/school (times/month)	161	36,454	967

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