Friday, Sept. 22

Lecture 4

Measuring sustainably

Comparing "Green Space" in cities

Vancouver Example

Connections between "Livable" and Sustainable Cities?

Many measures:
Employment, home ownership, safety, etc.

Sustainable Cities Index
https://www.arcadis.com/en/global/our-perspectives/sustainable-cities-index-2016/

Combination of 32 different indicators grouped
1. **People (Social)**
2. **Planet (Environmental)**
3. **Profit (Economic**

Top 10 Sustainable Cities of the World

- Zurich (Switzerland)
- Singapore (Singapore)
- Stockholm (Sweden)
- Wien (Austria)
- London (United Kingdom)
- Frankfurt (Germany)
- Seoul (South Korea)
- Hamburg (Germany)
- Prague (Czech Republic)
- Munich (Germany)

People sub-index

rates health (life expectancy and obesity),

education (literacy and universities), income inequality, work-life balance,

crime and housing and living costs.

These indicators perhaps capture "quality of life".

Some examples: Seoul 1, Montréal 10, Melbourne 22, Vancouver 23, Sydney 25, Toronto 40

Economic Health

Profit sub-index examines performance from a business perspective

Transport infrastructure (rail, air and traffic congestion)

Ease of doing business

Tourism

City's importance in global economic networks

Mobile and broadband access

Employment rates.

These indicators can broadly be thought of as capturing "economic health".

Examples: Singapore 1, New York 8, Canberra 20, Melbourne 26, Vancouver 29, Brisbane 30, Sydney 35, Toronto 38

Green factors:
The Planet sub-index

PLANET

Examples: Zurich 1, Vienna 4, Sydney 8, Vancouver 18, Toronto 28, Tokyo 50, Chicago 67, Mumbai 70, Beijing 97

Cities ranked on:

- Energy consumption
- Renewable energy share
- **Green space within cities***
- Recycling and composting rates
- Greenhouse gas emissions
- Natural catastrophe risk,
- Drinking water
- Sanitation
- Air pollution

Urban Green spaces are provide spaces to play, exercise, enjoy the day, have your lunch. These spaces contribute to the quality of life of the people of a city many ways. Some ways can be measured:
- increasing air quality,
- reducing the "heat island effect",
- improving the health of people in the community and other benefits that not that easily defined.

Satellite and related technology should enable comparison relatively easy.

Let's examine if this is the true.

World Cities Culture Report (cont.)

Green World Cities: Per cent of public green space: parks and gardens

Public greenspace defined to include public parks, community gardens, cemeteries, sports fields, national parks and wilderness area (from Bell et al. (2008).

Green World Cities
Table 1: Per cent of public green space

City	Per Cent	Source	Year
Moscow	54.0	Department of natural resources	2013
Sydney	48	New South Wales Department of Planning	2010
Singapore	47.0	National Parks Board	2011
Vienna	45.5	Vienna Annual Statistics	2014
Stockholm	40	Stockholm Stad	2014
Hong Kong	40	Agriculture, Fisheries and Conservation Department	2016

Source: http://www.worldcitiescultureforum.com/data/of-public-green-space-parks-and-gardens

Green World Cities
Table 1: Per cent of public green space (cont.)

City	Per Cent	Source	Year
Madrid	36	Las Artes, Deportes y Turismo	2012
London	33	Greenspace Information for Greater London	2013
New York	27	Department of City Planning Land Use	2010
Montréal	15	Direction des grands parcs et du verdissement	2013
Toronto	13	Toronto Parks, Forestry and Recreation Park Plan	2012
Paris	10	IAU	2013

# Green World Cities
Table 1: Per cent of public green space (cont.)

City	Per Cent	Source	Year
Melbourne	9	Metropolitan Planning Authority	2016
Los Angeles	7	Los Angeles County	2012
Mumbai	2.5	Tata Institute of Social Sciences	2011
Buenos Aires	9	CABA	2013
Tokyo	7.5	Bureau of Urban Development	2016

Note: Tokyo and Buenos Aires have 1.9 m$_2$ per capita

Several slides follow which display urban green areas

Mb too large to include

Vancouver
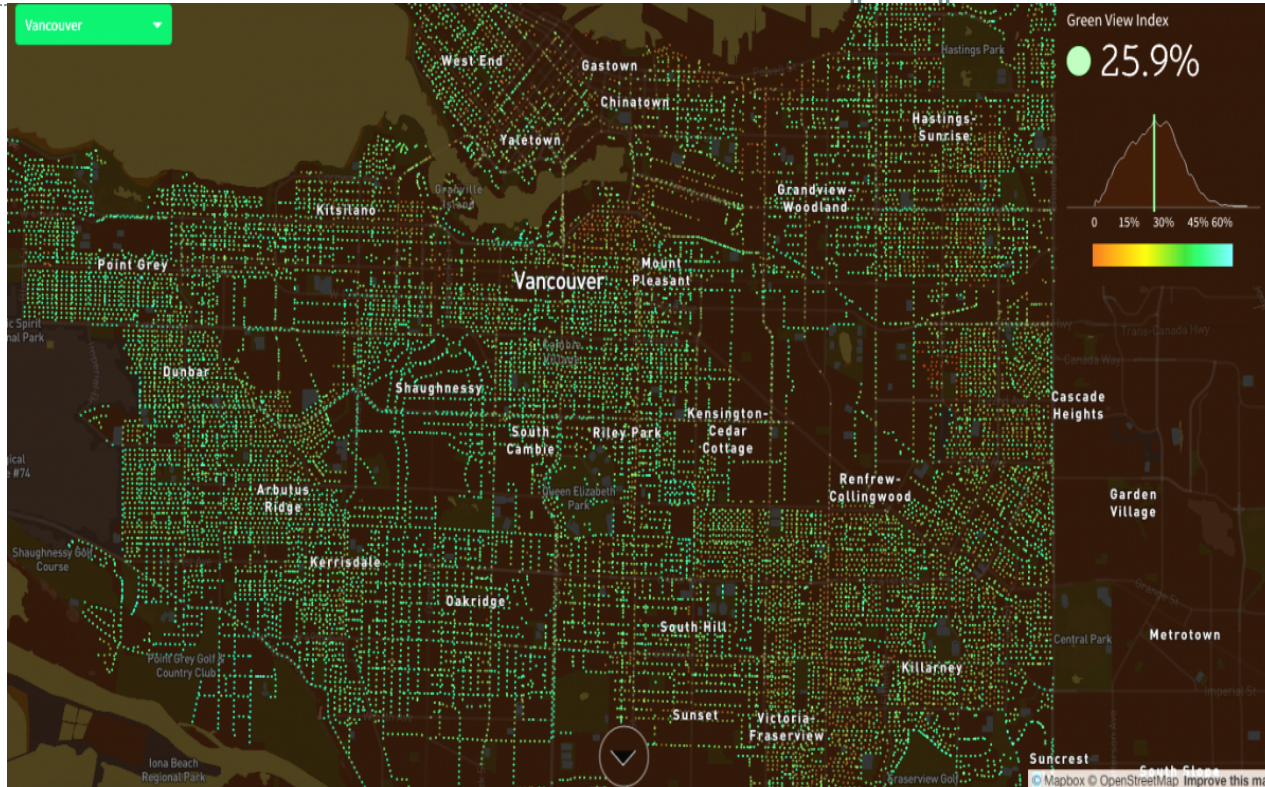
"Largest" urban tree canopy in world with 26%

Geneva, Switzerland: 21%

Seattle, USA: 20%

Toronto   19.5%

Sydney   15%

Hobart, Aust. 59%

Sources:
https://www.theguardian.com/world/2014/jul/17/sydney-melbourne-least-tree-biggest-cities

Vancouver

- Greater Vancouver's strategy to accommodate growth
- Adopted by Metro Vancouver (GVRD = Greater Vancouver Regional District) Focuses on land use
- Livability equated with 'quality of life'

Livable Region Strategic Plan

Adopted by the Greater Vancouver Regional District Board of Directors
January 26, 1996

Deemed to be a regional growth strategy by the Minister of Municipal Affairs
February 10, 1996

Policy and Planning Department

GVRD (1996)

Greater Vancouver Regional District

Photograph by: Ric Ernst/PNG, National Post

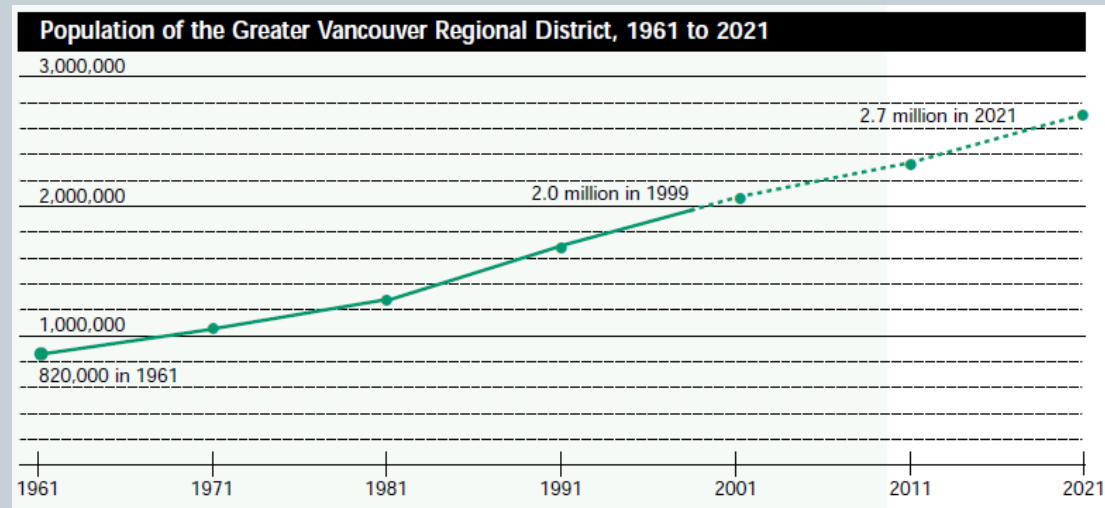# GVRD, comprised of 21 member municipalities and one electoral area

GVRD (1996)
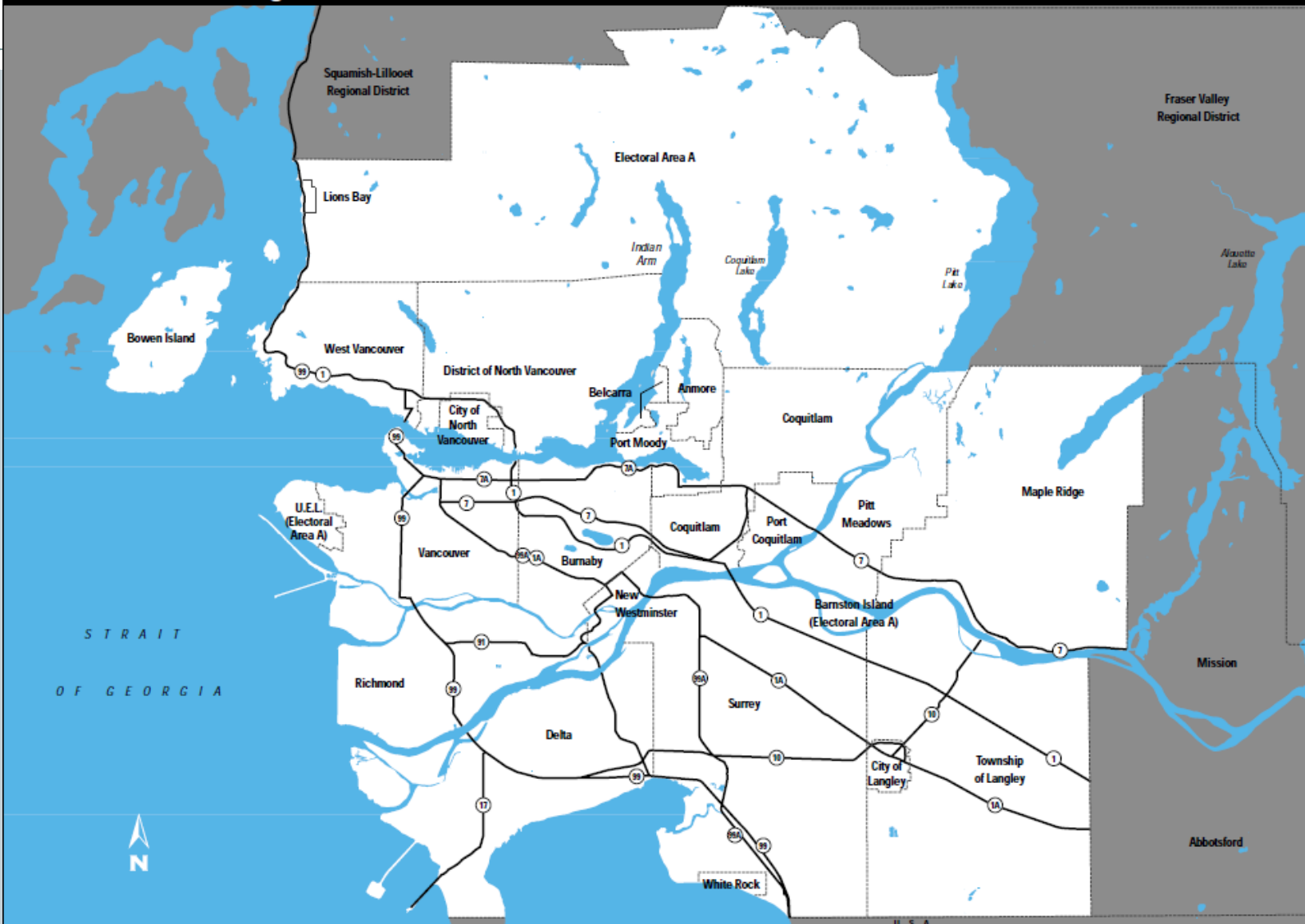
GVRD (1996)

Overall LRSP objectives

1. Help the region develop in a way that maintains and protects the environment;

2. Guide the location of urban activities to create a high quality of life;

GVRD (1996)

Population of the Greater Vancouver Regional District, 1961 to 2021

- 2.7 million in 2021
- 2.0 million in 1999
- 820,000 in 1961

The Challenge!!

- Population (2006, 2.2 million) will grow to 3.4 million in 2041 (Metro Vancouver, 2009)
- The LRSP provides a framework for making *regional* growth management and transportation decisions.

Plan Stakeholders

- 21 Member municipalities and Electoral Area A
- Greater Vancouver Transportation Authority
- First Nations
- Senior Governments
- Voluntary & Private Sector Organizations
     (e.g., Smart Growth BC)

http://www.johomaps.com/na/canada/bc/vancouver/firstnations/fnmusq.gif

LSRP

- Contains 4 fundamental strategies:

1. Protect the Green Zone
2. Build Complete Communities
3. Achieve a Compact Metropolitan Region
4. Increase Transportation Choice

1. Protect the Green Zone

- Protects Greater Vancouver's natural assets:
  - Major parks
  - Drinking water supply – Capilano, Seymour and Coquitlam watersheds;
  - Ecologically important areas and resource lands (farmland); 54,000 ha of land within GVRD is part of the Agricultural Land Reserve (GVRD 1996)

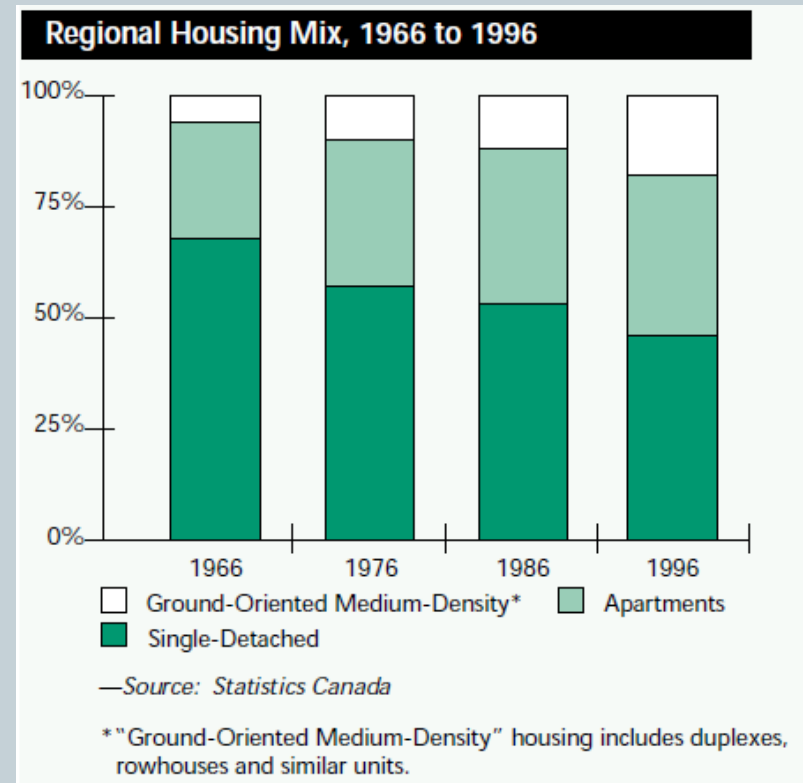- Set a long-term boundary for urban growth

Photo credit: http://www.vancourier.com/Letter+week/4032655/story.html

2. Build Complete Communities

- Those having …
  - a wider range of opportunities for 'day to day' life
  - jobs closer to where people live
  - shops and services near home
  - wider choice of housing types
- Regional Town Centre model

GVRD (1996)

Vancouver's Regional Town Centres (RTCs)

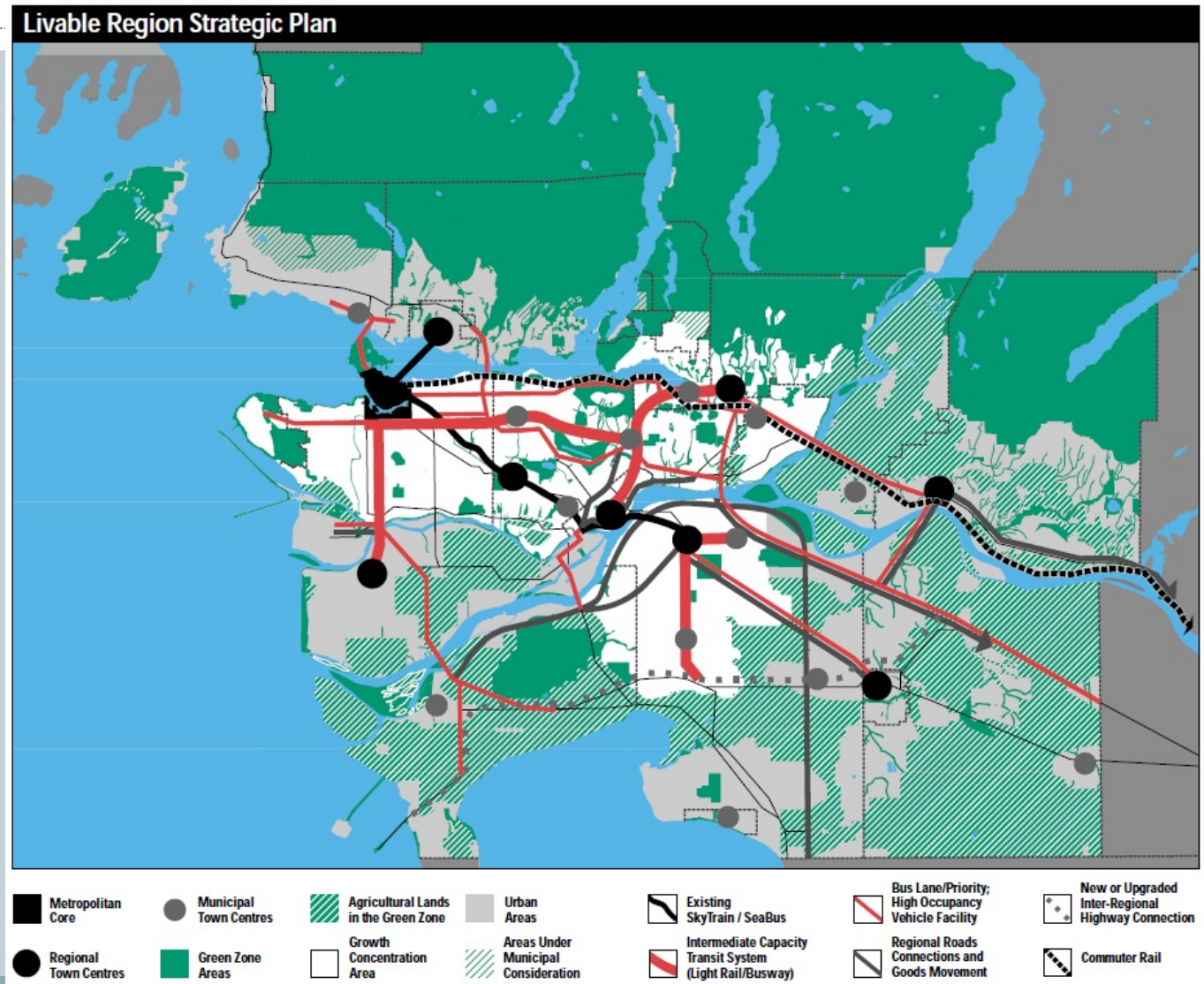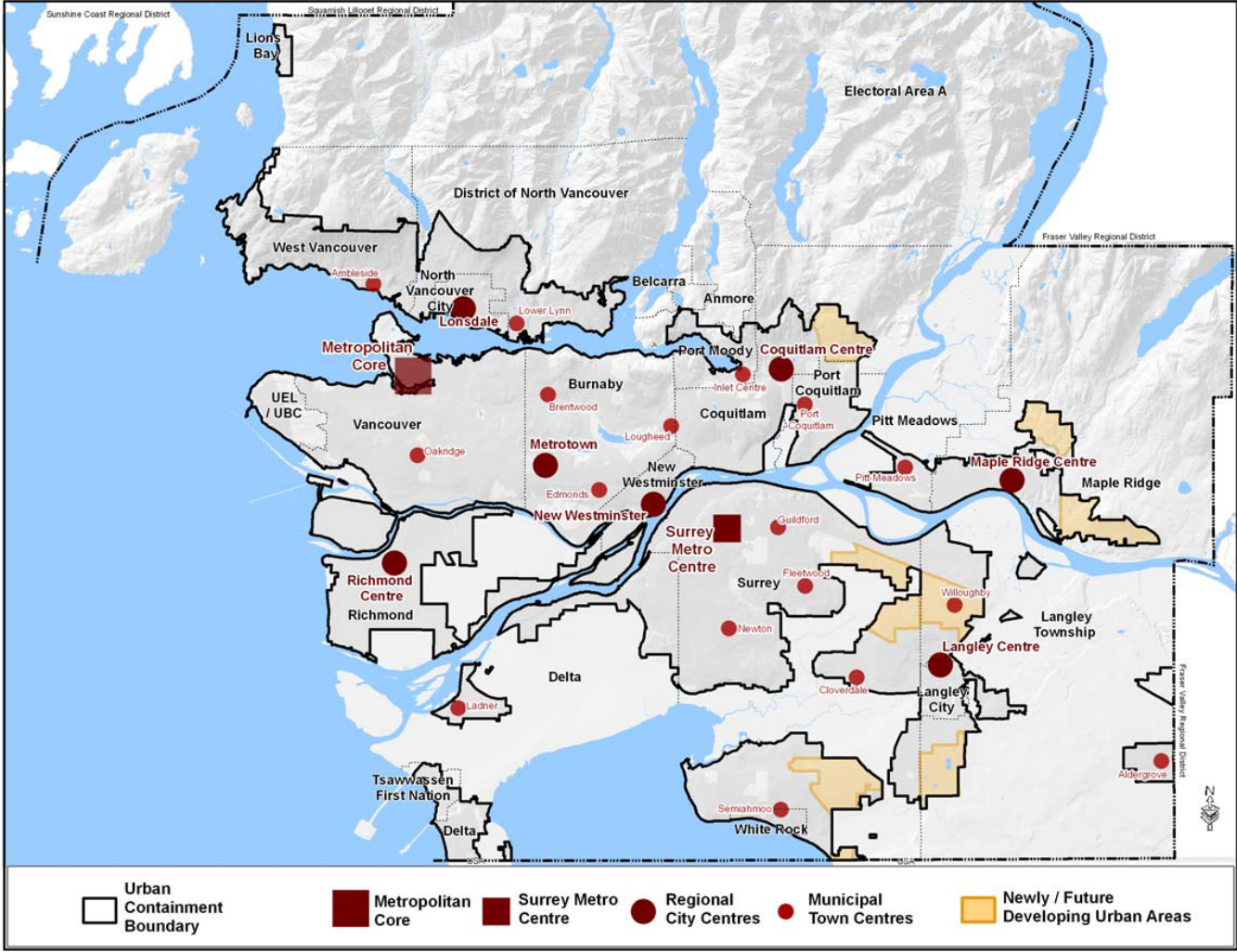- 3 types of centre:
- Metro Core
- Municipal
- Regional

GVRD (1996)

Livable Region Strategic Plan

Symbol	Legend
■	Metropolitan Core
●	Regional Town Centres
⬤ (grey)	Municipal Town Centres
▨ (green hatch)	Agricultural Lands in the Green Zone
■ (green)	Green Zone Areas
▨ (grey)	Urban Areas
☐	Growth Concentration Area
▨ (blue hatch)	Areas Under Municipal Consideration
—	Existing SkyTrain / SeaBus
— (red)	Intermediate Capacity Transit System (Light Rail/Busway)
▨ (red)	Bus Lane/Priority; High Occupancy Vehicle Facility
▨ (grey)	Regional Roads Connections and Goods Movement
•••	New or Upgraded Inter-Regional Highway Connection
◇	Commuter Rail

Figure 2. Metro 2040 – Create a Compact Urban Area

Metro Vancouver (Nov. 2009)

3. Achieve a Compact Metropolitan Region

- Goal: 70% of GVRD population in the Growth Concentration Area by 2021 (GVRD, 1996)

GVRD (1996)
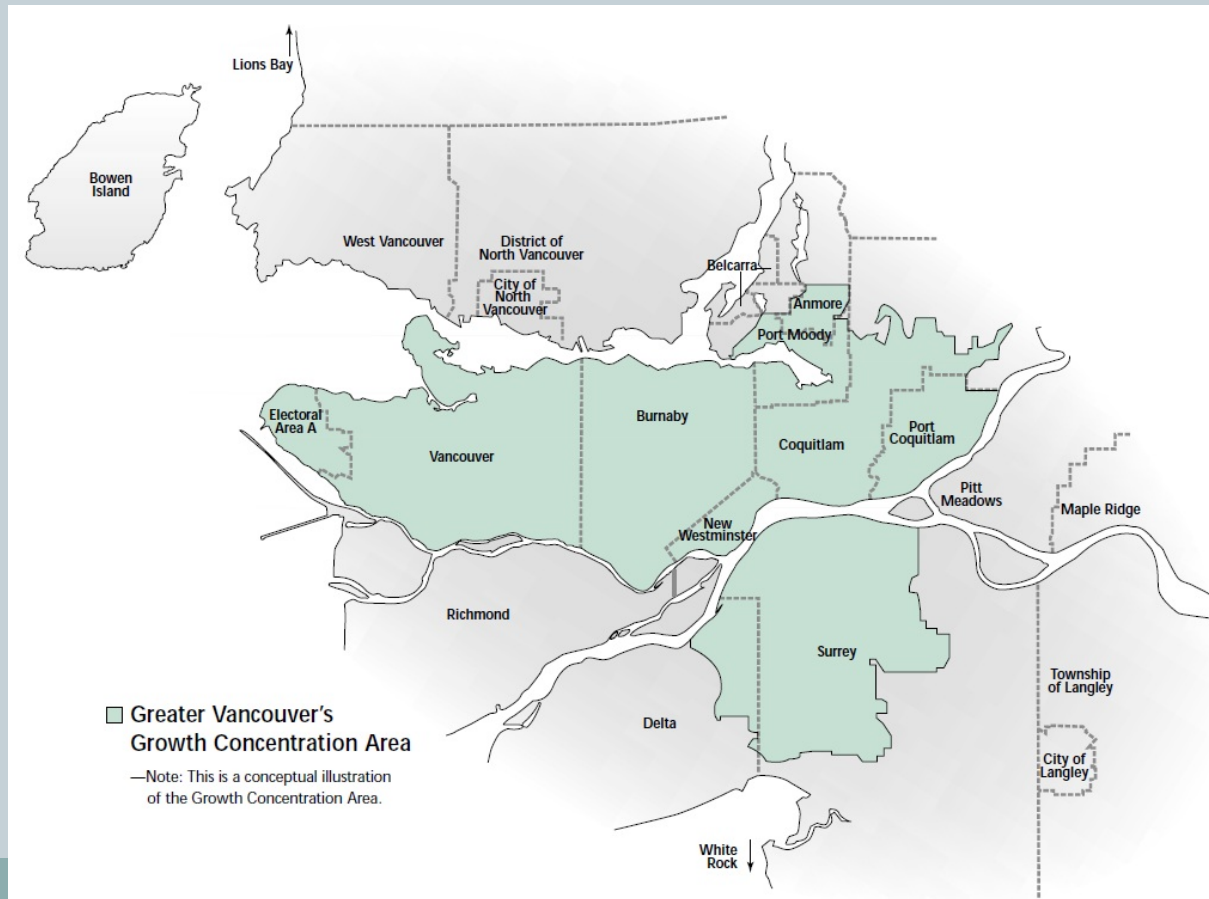
3. Achieve a Compact Metropolitan Region

- Avoid widely dispersed development
- Concentrating growth
  - encourage people to live closer to the jobs;
  - better use of transit and other community services;
  - lessen land consumption on the urban fringe;
- Compact develop supports an efficient cost-effective transportation system;

Table 2 Transit Density Requirements (based on Pushkarev and Zupan 1977)

Mode	Service Type	Minimum Density (Dwelling Units Per Acre)	Area and Location
Dial-a-Bus	Demand response serving general public (not just people with disabilities.	3.5 to 6	Community-wide
"Minimum" Local Bus	1/2-mile route spacing, 20 buses per day	4	Neighborhood
"Intermediate" Local Bus	1/2-mile route spacing, 40 buses per day	7	Neighborhood
"Frequent" Local Bus	1/2-mile route spacing, 120 buses per day	15	Neighborhood
Express Bus – Foot access	Five buses during two-hour peak period	15	Average density over 20-square-mile area within 10 to 15 miles of a large downtown
Express Bus – Auto access	Five to ten buses during two-hour peak period	15	Average density over 20-square-mile tributary area, within 10 to 15 miles of a large downtown
Light Rail	Five minute headways or better during peak hour.	9	Within walking distance of transit line, serving large downtown.
Rapid Transit	Five minute headways or better during peak hour.	12	Within walking distance of transit stations serving large downtown.
Commuter Rail	Twenty trains a day.	1 to 2	Serving very large downtown.

This table, based on research by Pushkarev and Zupan (1977), indicates typical residential densities needed for various types of transit service. Such requirements are variable depending on other geographic, demographic and management factors.

4. Increase Transportation Choice

- Supports the use of public transit and reduced dependence on the single occupant vehicle;
- Cycling networks
- Pedestrian-oriented development:
  - → vibrancy, amenity viability, connectivity (to amenities) and safety in neighbourhoods in core / regional / municipal centres and around transportation hubs;

Map B.1: Frequent Transit Network Concept

LEGEND

Rapid Transit	▬▬▬
Proposed Rapid Transit (Bus/Rail) +	▬▬▬
Frequent Bus Concept +	▬▬▬
Inter-Regional Connections	••••
Existing Local Network	▬▬▬
West Coast Express	▮▮▮▮▮
Metropolitan Core	●
Proposed Surrey Metro Centre	●
Regional City Centre	●
Ferry Terminal	⚓
Protected Areas, Agriculture and Open Space	▮

+ Alignments are conceptual

Source: TransLink
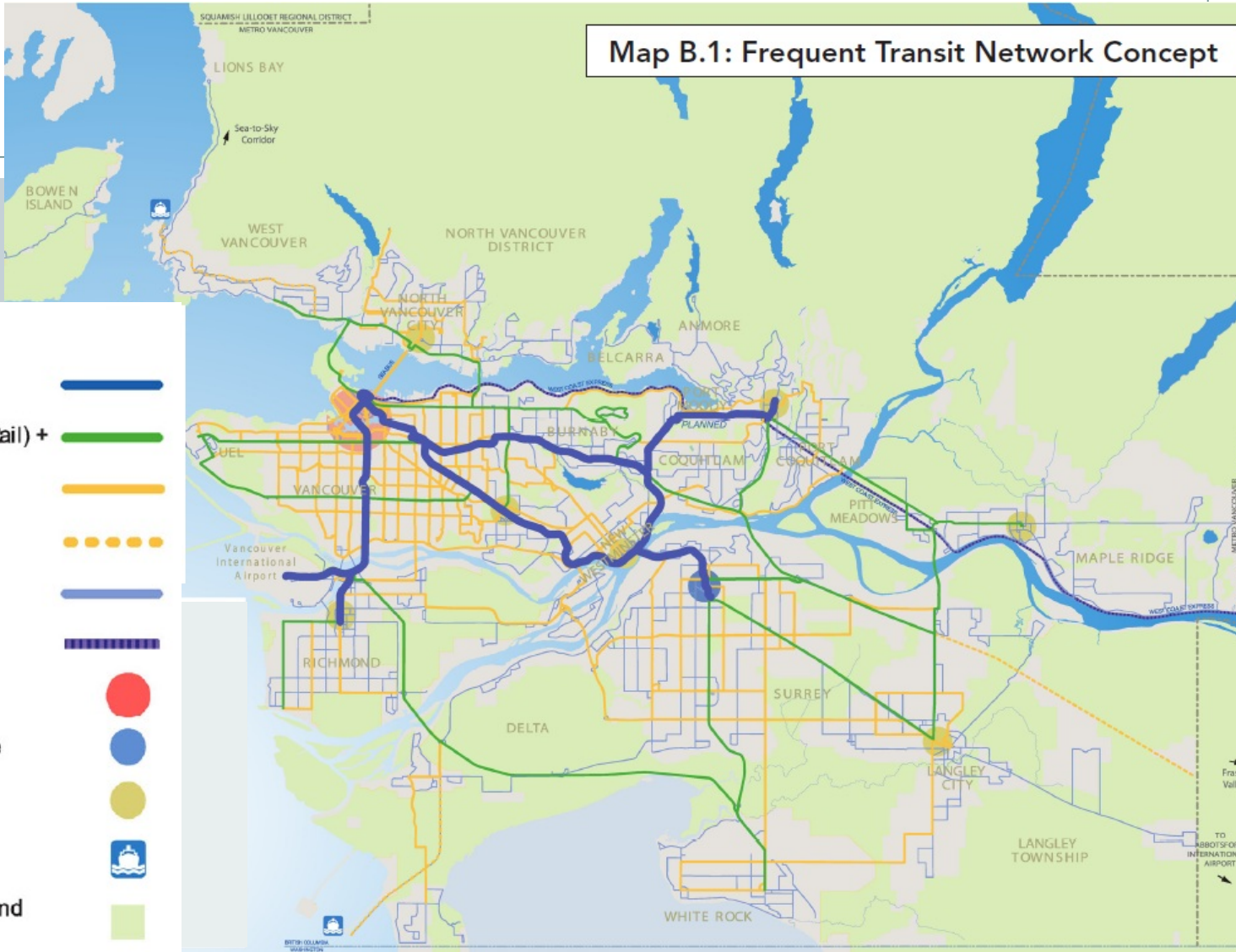
Source: Translink (Metro Vancouver transit planning authority)

Discussion