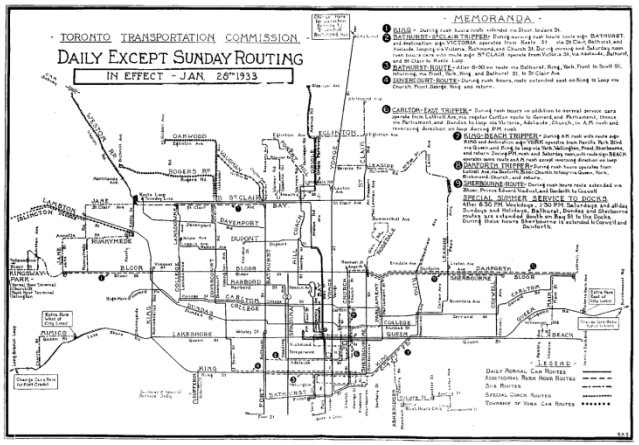
An Overview of Rapid Transit Typical Characteristics

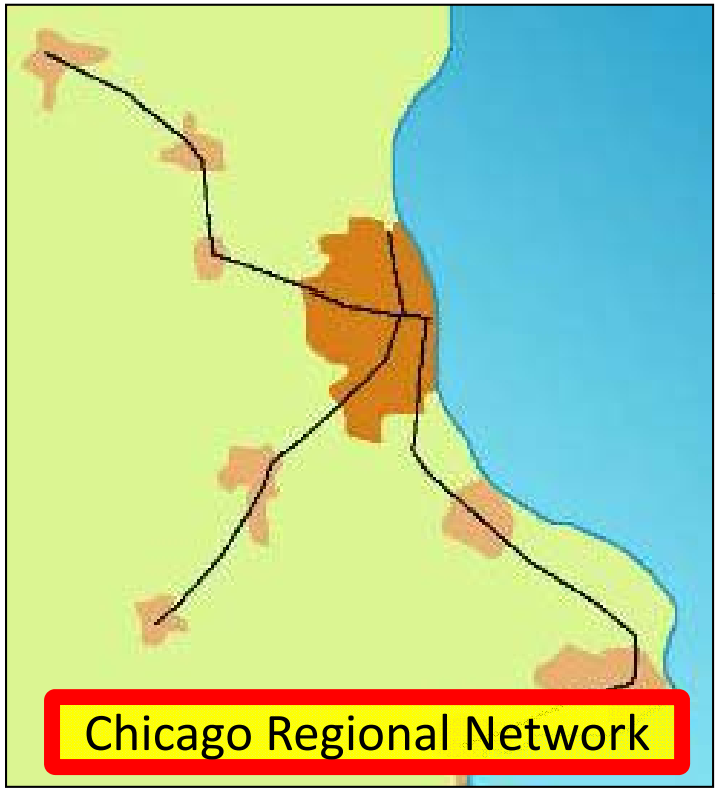
Date April 30, 2009

Land Use and Transportation – Is there a link?

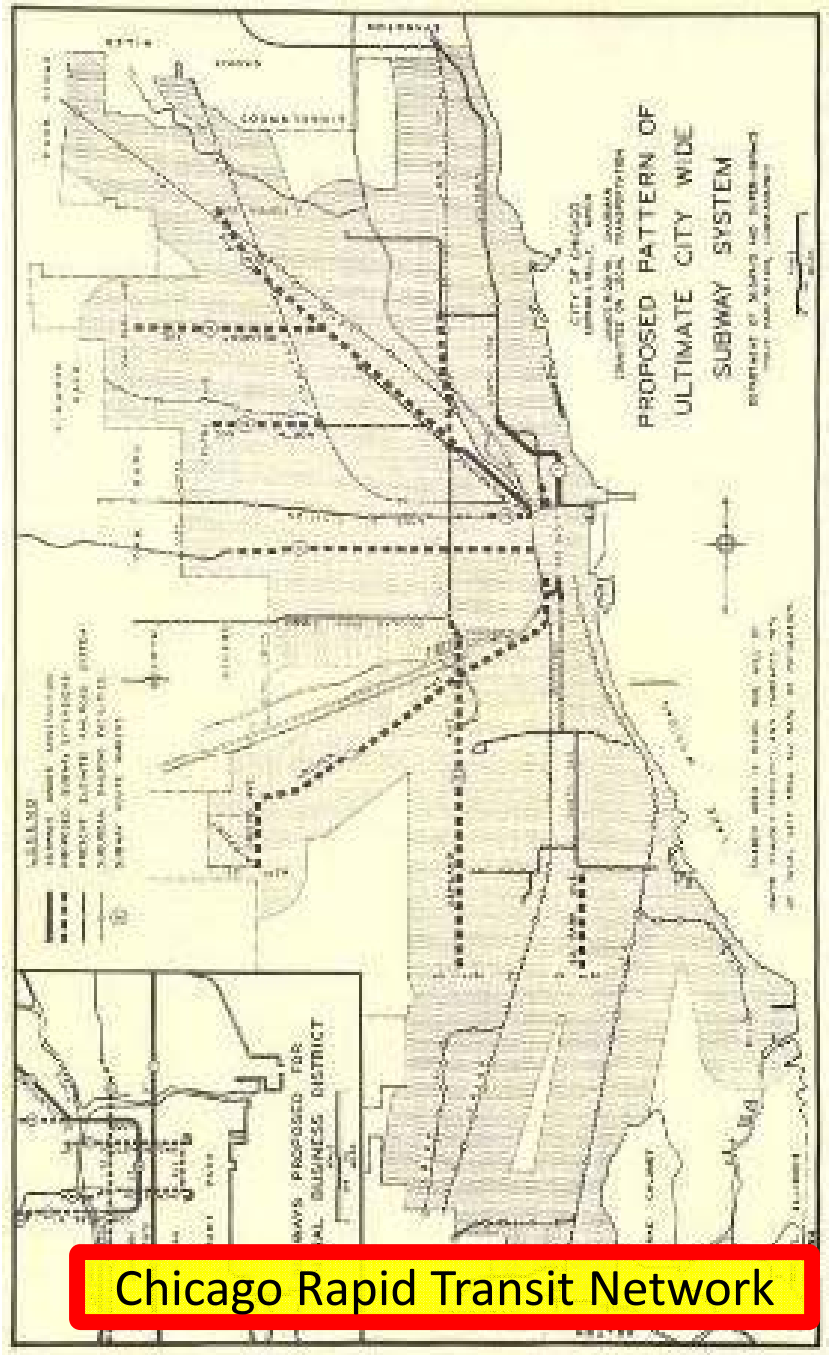
- ‘Streetcar Suburbs’ were the result of land developers creating streetcar lines in order to bring people to their developments.
- Rapid Transit has the ability to influence land use but only if development is promoted.

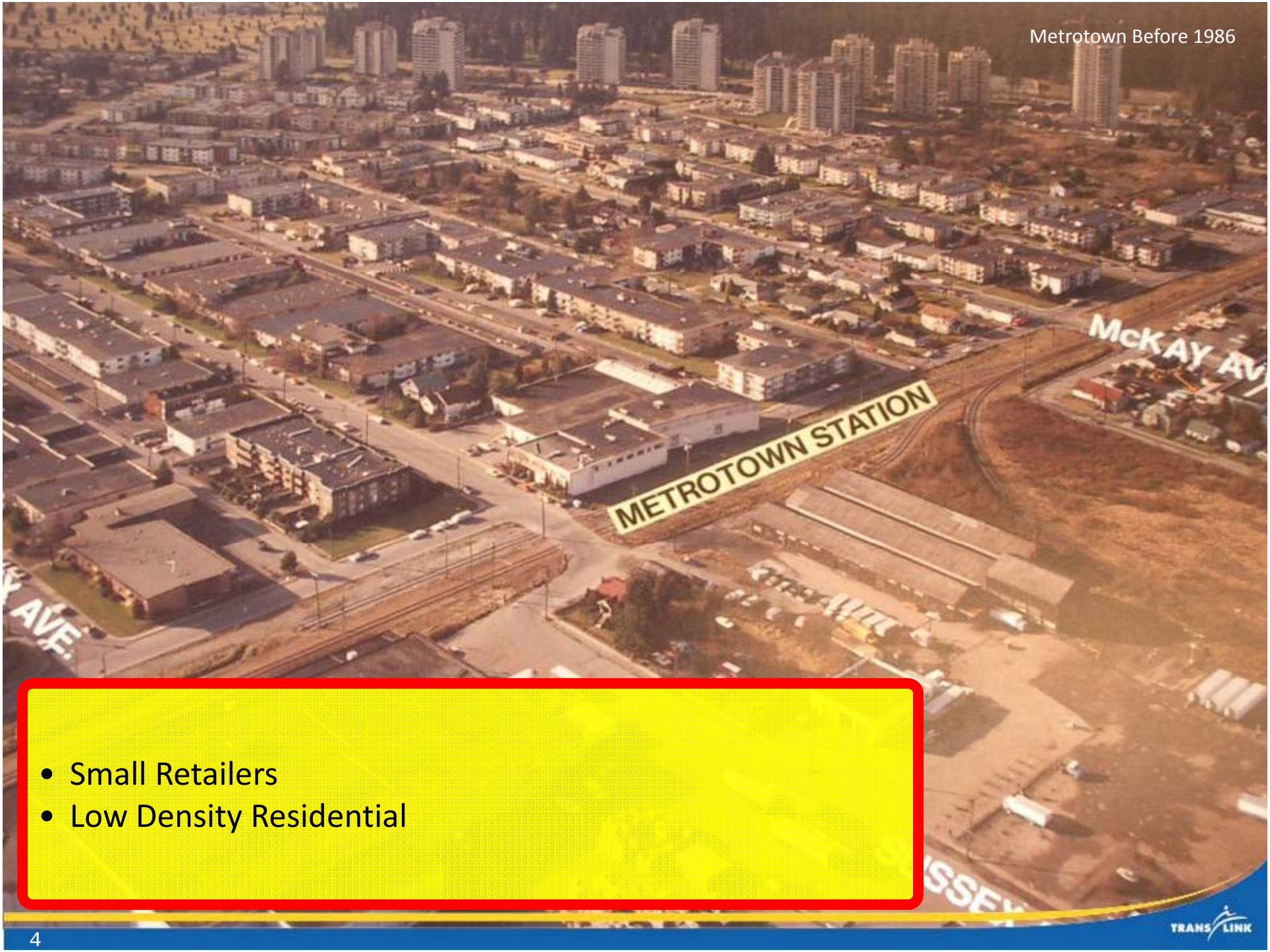


- Historically, Rapid Transit was laid out in a “finger plan”



- or with urban development as “pearls on a necklace”





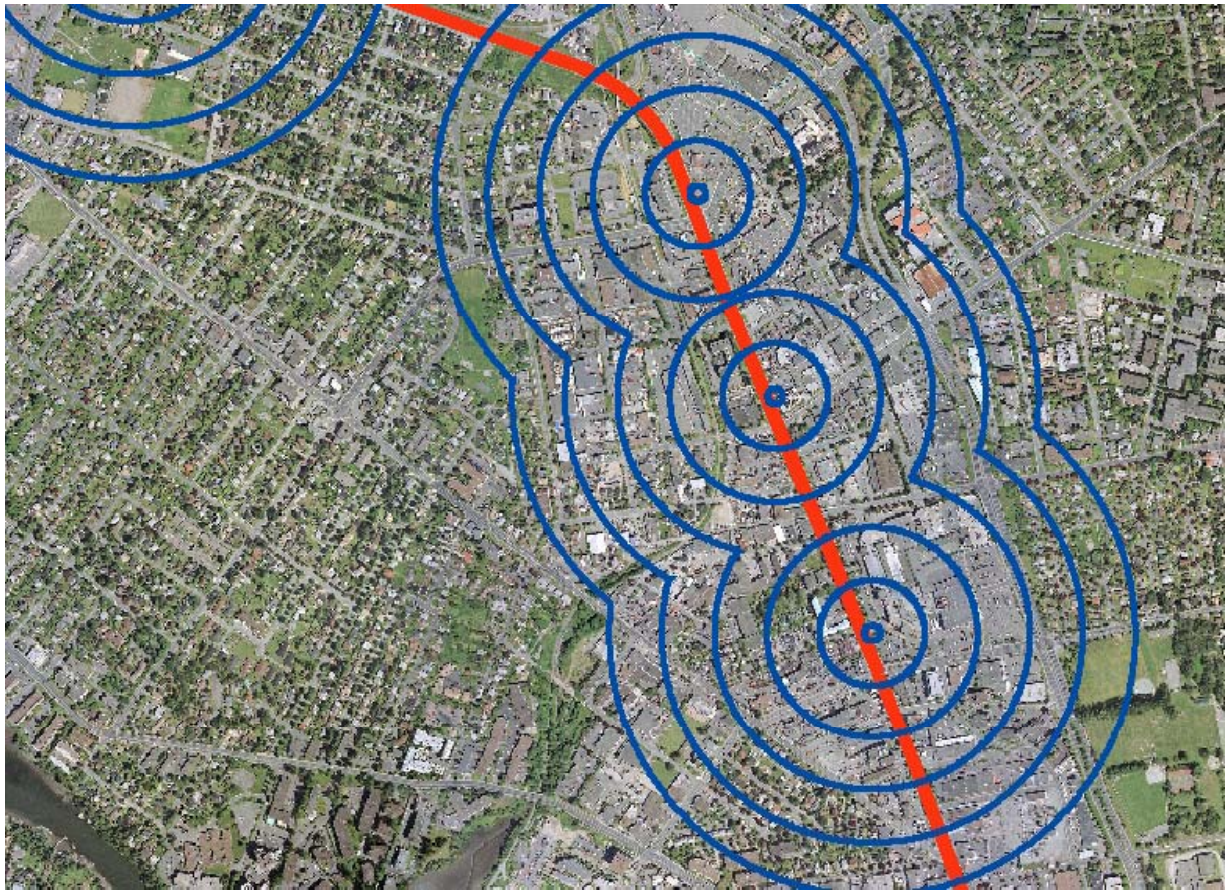
- Small Retailers
- Low Density Residential

Metrotown Today

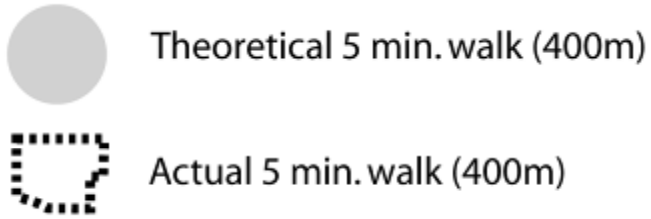
- 2nd largest mall in Canada
- Office, residential, hotel, recreation amenities of a true town centre
- Note the amount of density the pre-existed

- Efficient transit needs high-density corridors, not just high-density developments
- Every kilometer of distance costs money; long distances result in less efficient transit
- Transit can help lead development along corridors

- The most efficient transit lines are those with fixed lines and fixed stops/stations
- Stops/stations are determined by:
  - Density: how many residents, jobs, and activities are within walking distance (400m) of a stop
  - Pedestrian access: how many of the activities within a 400m radius are within a 400m walk

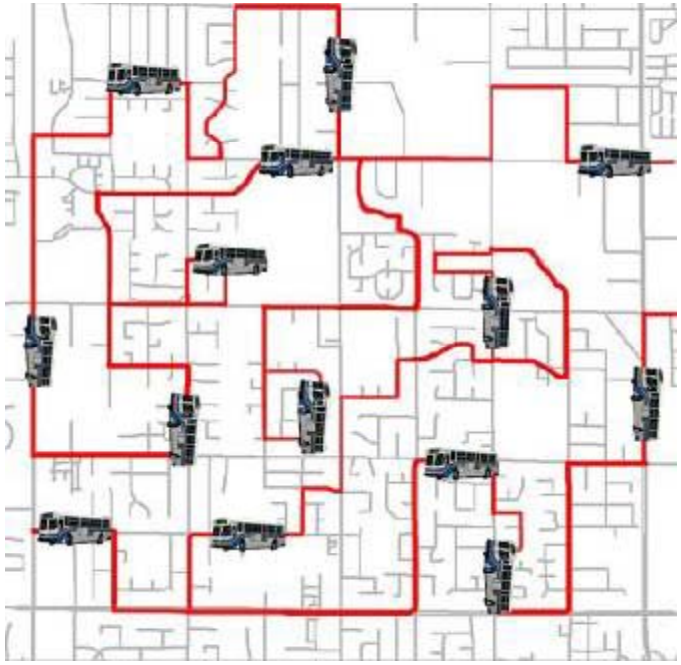


- The ideal pedestrian environment maximizes the street network within a 400m radius



- A disconnected street pattern means that there are areas that are not accessible to pedestrians

Same # of buses

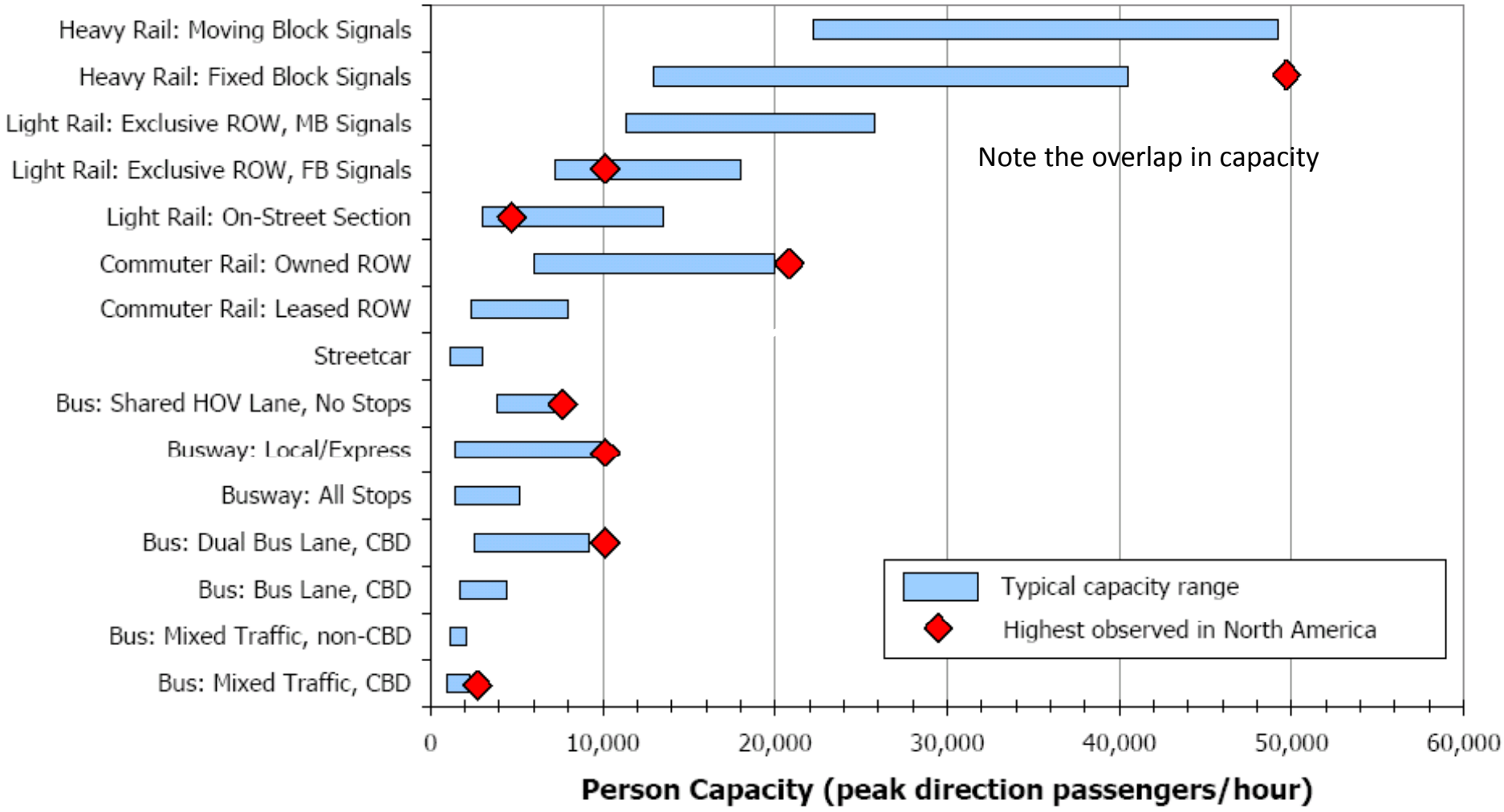


- Ridership model
  - The high-density areas of the community get frequent service, while the low-density areas get no service
- Coverage model
  - Everyone has transit service but at a lower frequency (usually every half hour or hour, with limited evening service)

Rapid Transit Systems

Typical Characteristics of Each Transit System	Local Bus	Express or Rapid Bus	Bus Rapid Transit (BRT)	Modern Streetcar	Light Rail Transit	Metro / Subway	Commuter Rail
							
System Speed (including stops)	8 to 25 km/hr	15 to 30km/hr	20 to 40 km/h	20 to 40 km/h	30 to 50 km/h	40 to 70 km/h	30 to 80 km/h
System Capacity	200-1,200 passengers/hr	500-3,000 passengers/hr	2,000-10,000 passengers/hr	1,000-6,000 passengers/hr	3,000-18,000 passengers/hr	10,000-40,000 passengers/hr	2,000 to 20,000 passengers/hr
People Capacity / Vehicle	40-60	40-110	75-110 (Articulated)	130-160	150-200 per car	180-280 per car	100-200 per car
Running Way	Mixed traffic	Mixed traffic and/or exclusive lanes with traffic signal priority	Exclusive right of way with signal pre-emption at crossings	Mixed traffic and/or exclusive lanes/ right of way	Exclusive running way generally on grade	Exclusive running way fully segregated	Exclusive right of way with priority at grade crossings
Stop/Station Spacing	< 0.3km	0.5 km to 2 km	0.5 km to 2 km	< 2 km	1 km to 2 km	1 km to 2 km	>2 km

Transit Mode Comparison: Capacity



Source: Transit Cooperative Research Program Transit Capacity Manual

Bus Rapid Transit (BRT)

- Branded Service with amenities
- Dedicated right of way (as much as possible)
- Transit Signal Priority
- Attractive stations & real-time info
- Stations every 1 km or so
- "LRT on Rubber tires"

Los Angeles, Orange Line

Rouen, France

Bogota, Columbia

Eugene, Oregon

Streetcar/Tram

- Often confused with LRT
- Dedicated ROW or in-street
- Stations every 1 km or so
- Smaller units
- Longer headways

Seattle

Portland

San Francisco

Light Rail (LRT)

- Mainly at-grade
- Dedicated right of way
- Overhead electric power
- Stops at stations, every 1 km or so
- Operators on board
- Sometimes confused with Subway/Metro
  "Heavy Rail Transit – Larger Vehicles"

Automated LRT

- Fully Segregated Right-of-Way
- Stops at stations, every 1 km or so.
- Automated Trains
- Third Rail electric power

London, England – Dockyard LR Line

Kuala Lumpur, Malaysia – E Line

Vancouver – Millennium Line

Metro/Subway

- Heavy Rail – Larger Vehicle
- Fully Separated right of way
- Typically below grade
- High level of service
  (as low as 90 second headways)
- Heavy grade vehicles
- Operators and conductors
- Stations every 1km

New York

Boston – Green Line


Chicago – The ”L”

Commuter Rail

- Suburbs to downtown
- Long units with bi-level or single level cars
- Push-Pull (1 engine rail car plus passenger rail cars)
- Budd Car (combined engine/ passenger car “1 unit”)
- DMU (Larger version of Budd Car)
- Conductor & Engineer

California
“Push Pull”

_____
“DMU”

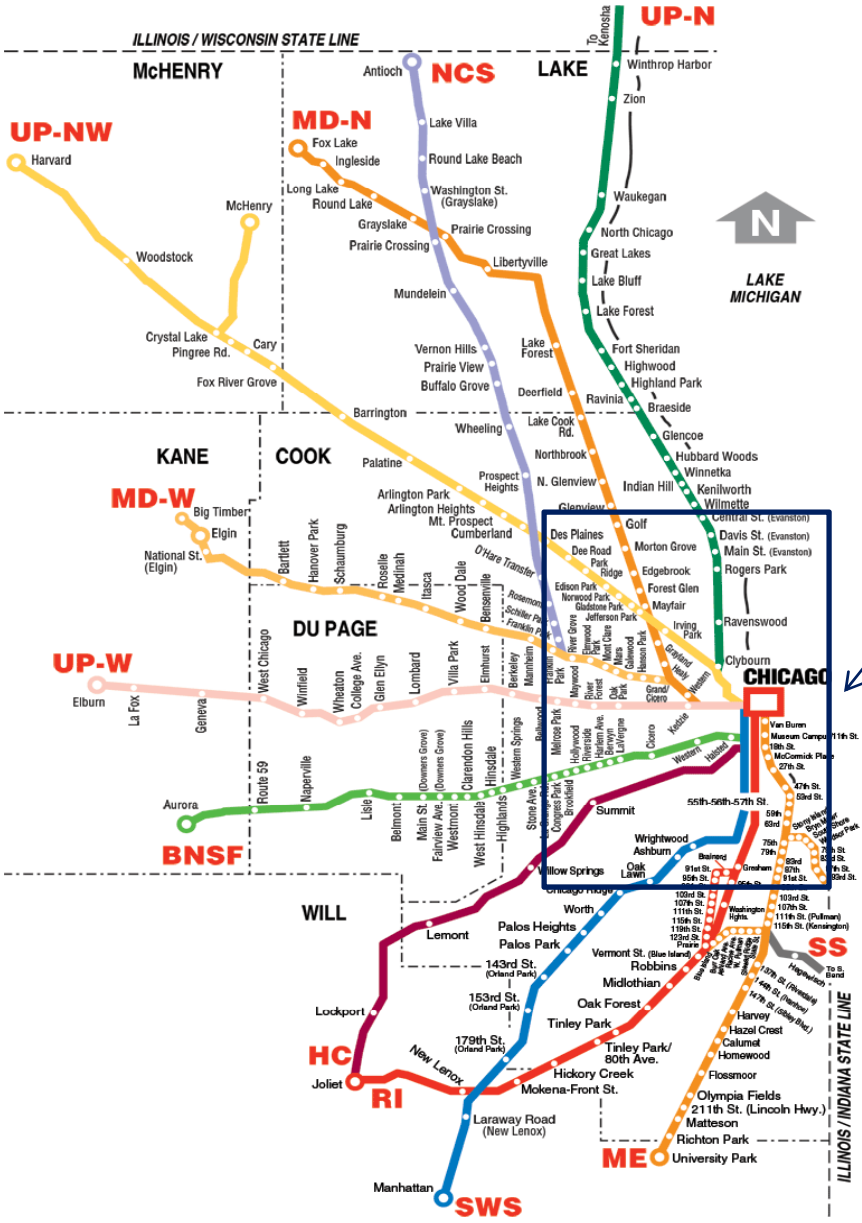
_____
“DMU”

Vancouver – Westcoast Express
“Push-Pull” Train

What is the difference between Urban rapid transit and regional commuter rail?

Urban Rapid Transit is designed to move large volumes of people over short to moderate distances within urban areas

Regional Commuter Rail is designed to connect distant suburbs with metropolitan downtown core



Extent of Rapid Transit Network