Transportation Infrastructure, Sustainable Development & Economic Growth

Lessons for Wanneroo

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University of California, Berkeley

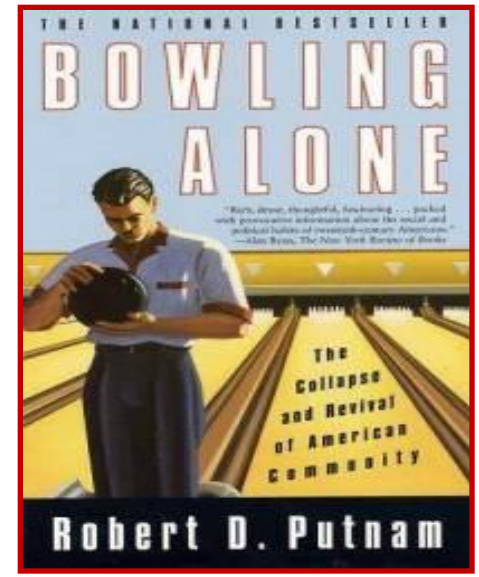
Wanneroo Jobs Summit 2016



What People in Wanneroo Want

City of Wanneroo, Advocacy & Economic Development

Traffic Congestion/Excess Commuting
Erodes Economic Growth & Quality of Life
… *Time Pollution*

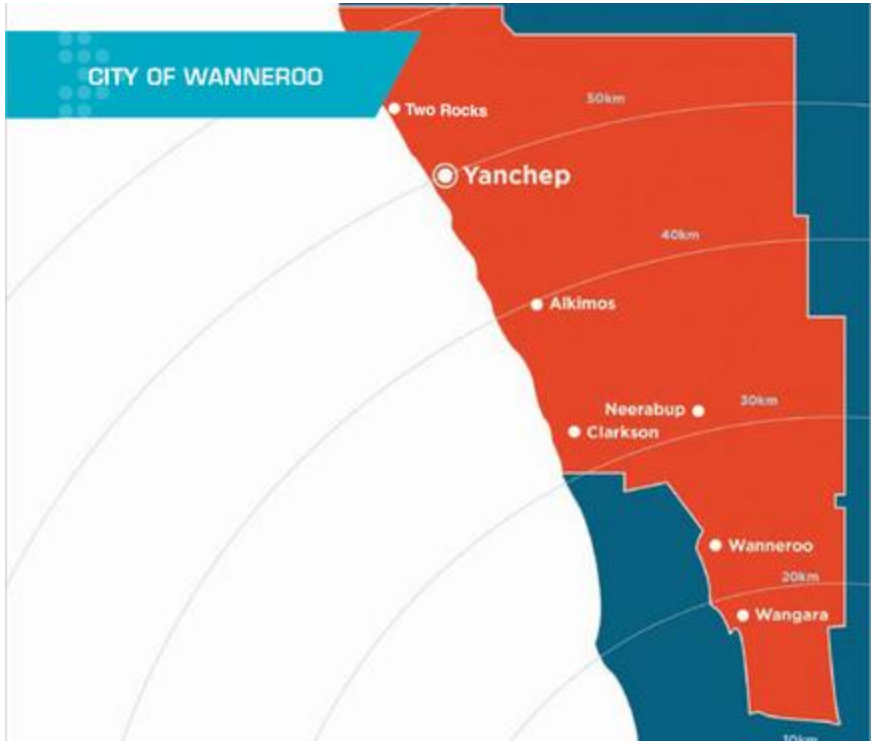


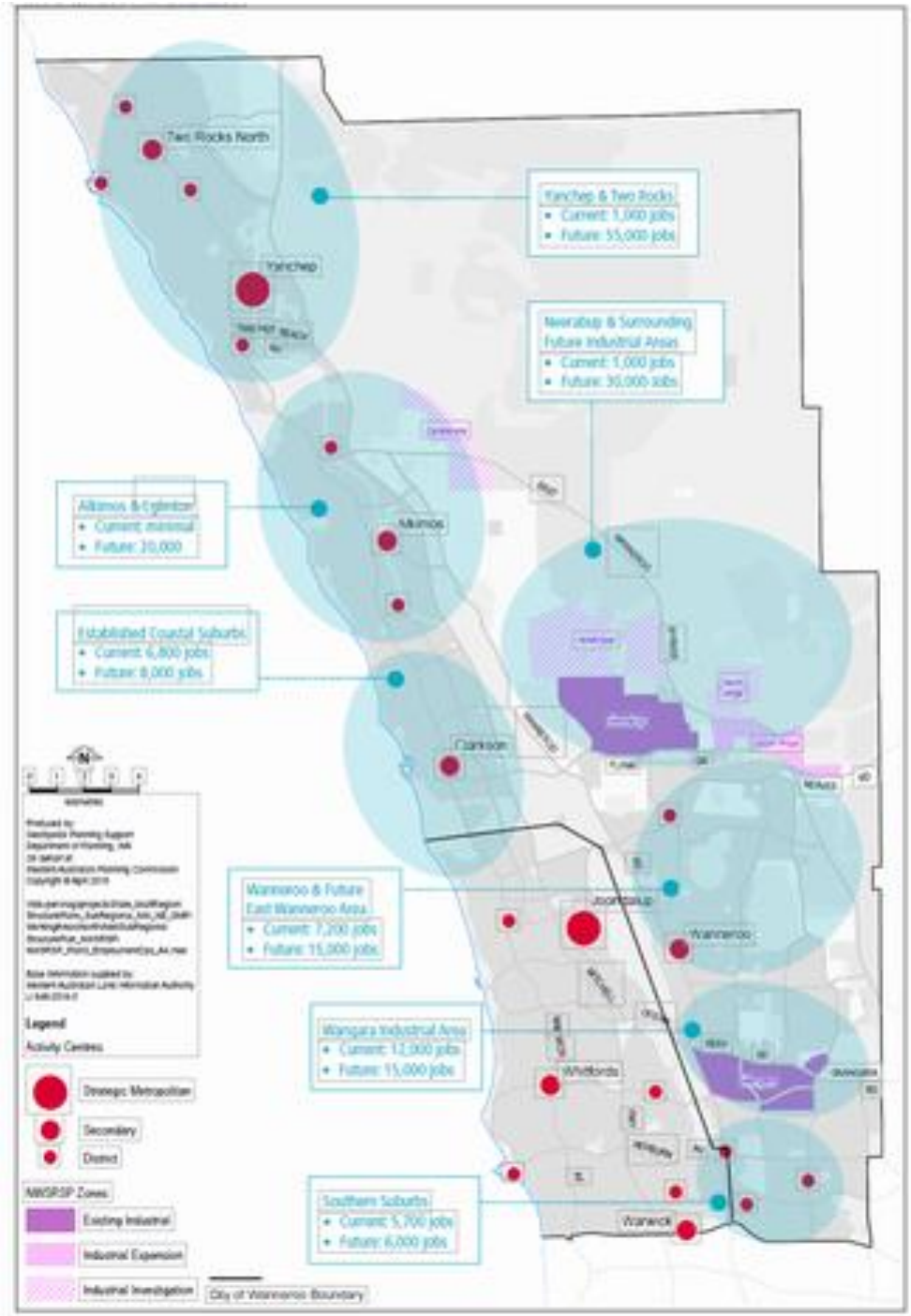
City of Wanneroo

ECONOMIC DEVELOPMENT STRATEGY & ACTION PLAN

Strategic Economic Growth 2016-2021

Tremendous Anticipated Job Growth

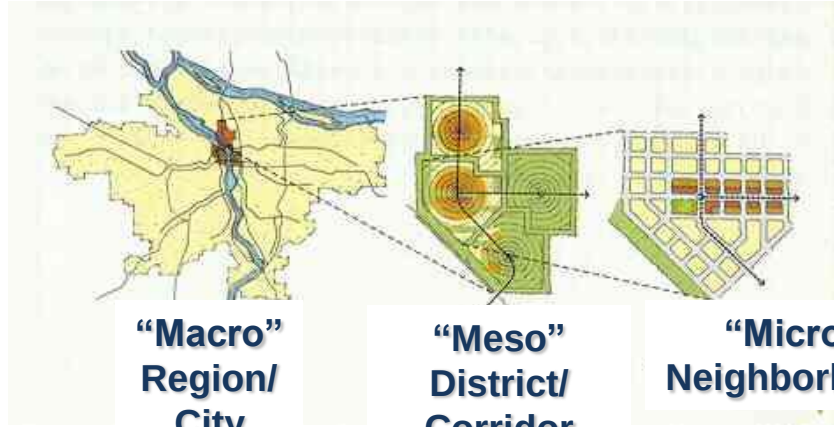




My Remarks

- Infrastructure & Economic Competitiveness

- City/Corridor Context:
  - Self-Sufficiency/Containment
  - Urban Centers



- Neighborhood Context:
  - Transit-Oriented Development
  - Connectivity & Place-making
  - Megatrends/New-Age Mobility

WORLD ECONOMIC FORUM

ECONOMIC COMPETITIVENESS:

Institutions, policies, and factors that shape economic productivity and standing in a country, region or community.

The physical plant of the c

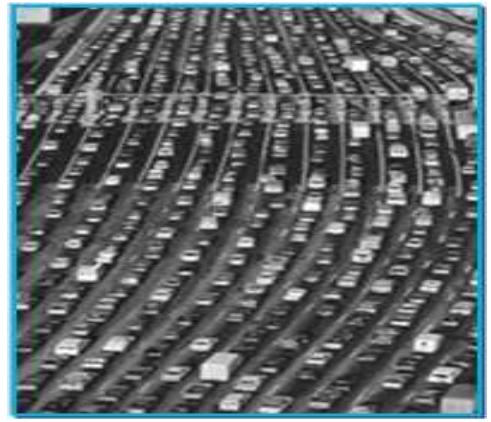
Transport: roads & mass transport
Water supply systems
Sanitation/Waste Water Manageme
Solid Waste Management
Drainage & Flood Protection
Power generation & distribution
Telecommunications

Transport Investments & Economic Growth

- ***Transport: Factor input to economic production***; firms avoid congested areas to reduce deadweight losses/idle labor.

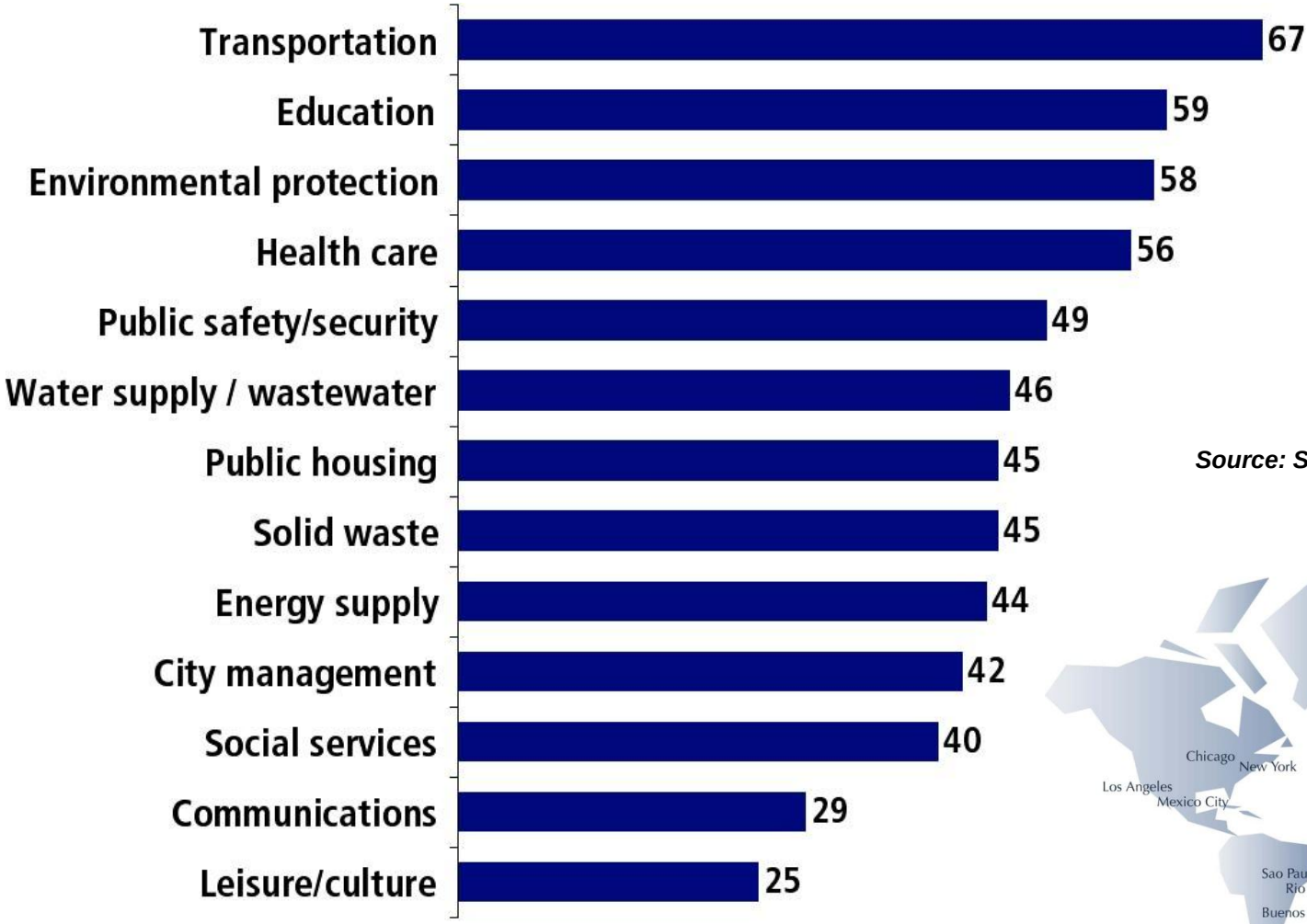
- ***Traffic congestion:*** bottleneck to economic growth, lowering GRDP by 2% to 5% <*delays, unpredictability*>

- ***Externalities***: adding unwanted by-products (local & global pollution), fuel waste & accidents raise to 7%-11%



Priority Investments to Attract Businesses/ Economic Competitiveness

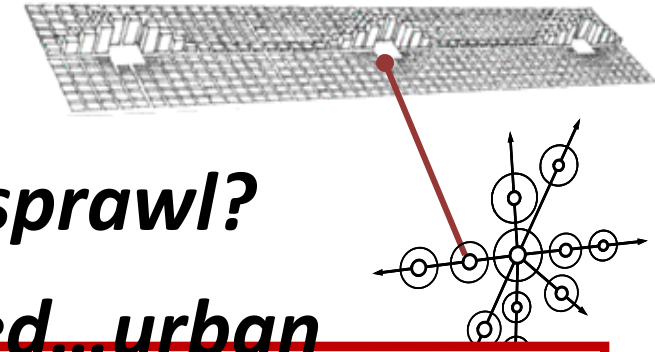
% Mayors Rating "Very High"



Source: Siemens, Globescan, McLean Hazel 2010

Spatial Implications

- ***Urban transport investments enlarge labor markets and trade-sheds –*** *e.g., better matching & access to specialized skills*



- ***Enlargement = car-dependent sprawl?***
- ***Key: how densities are organized…urban management & role of planning***

…earls"

Self-Containment & Balanced Growth

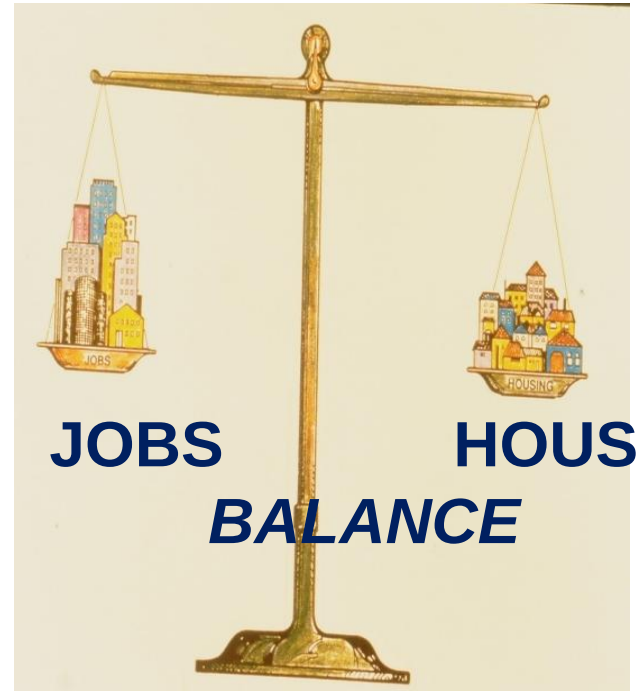
Economic Development Strategy

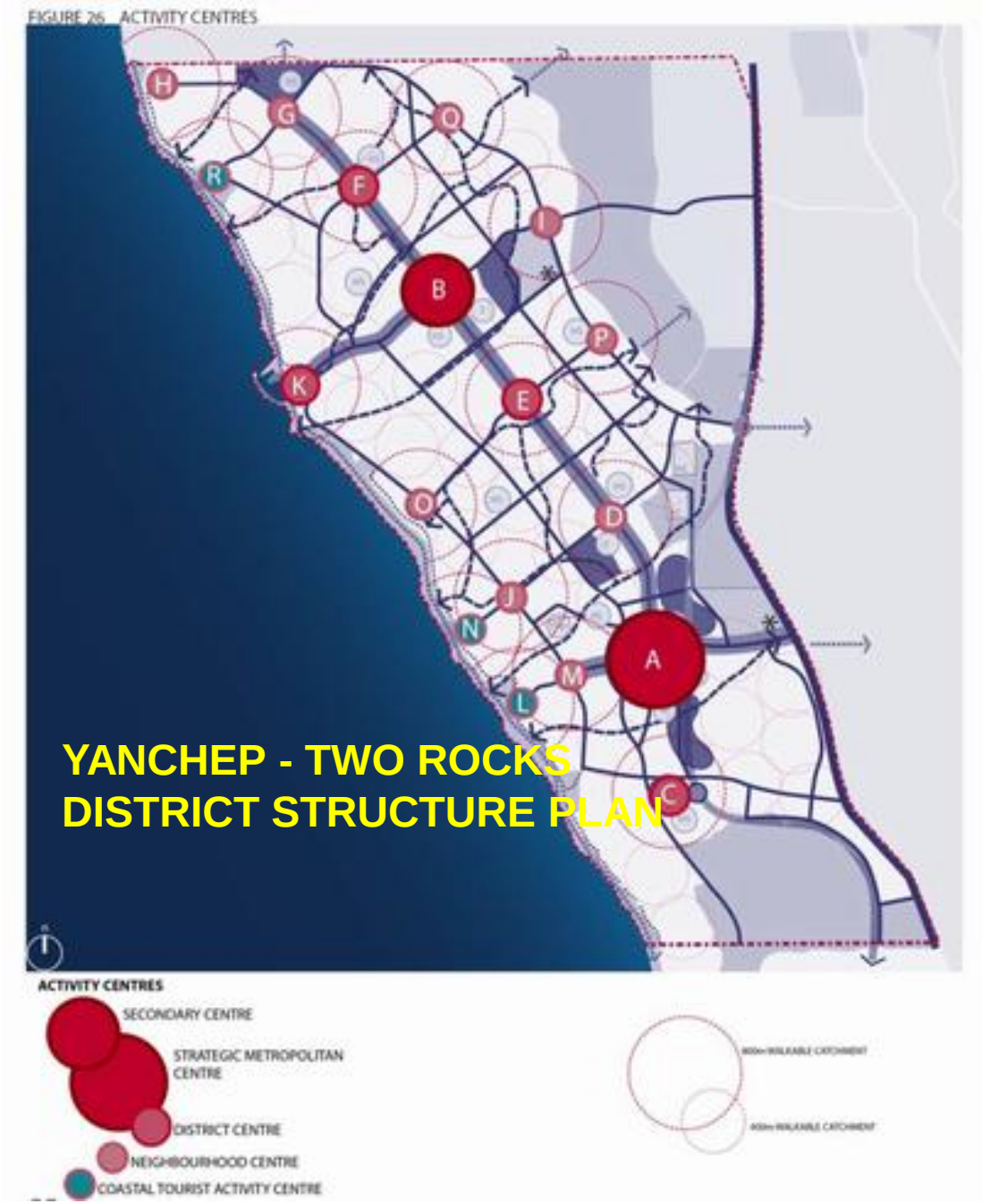
- The City of Wanneroo's primary economic goal is to decrease the amount of people having to travel outside of the region to access suitable employment opportunities.*

* *YANCHEP - TWO ROCKS DISTRICT STRUCTURE PLAN, p. 86,* November 2010.

Regional Employment Self-Sufficiency Target = 60% **

** City of Wanneroo, *Economic Development Strategy & Action Plan*, 2016-2021





Yanchep – Two-Rocks DSP

***Goal*: 72% employment self-sufficiency**

Advanced through:

- **Hierarchy of Mixed-Use Activit Centers & Corridors**
- **Excellent public transportatio & pedestrian infrastructure**
- **5-minute ped-sheds**

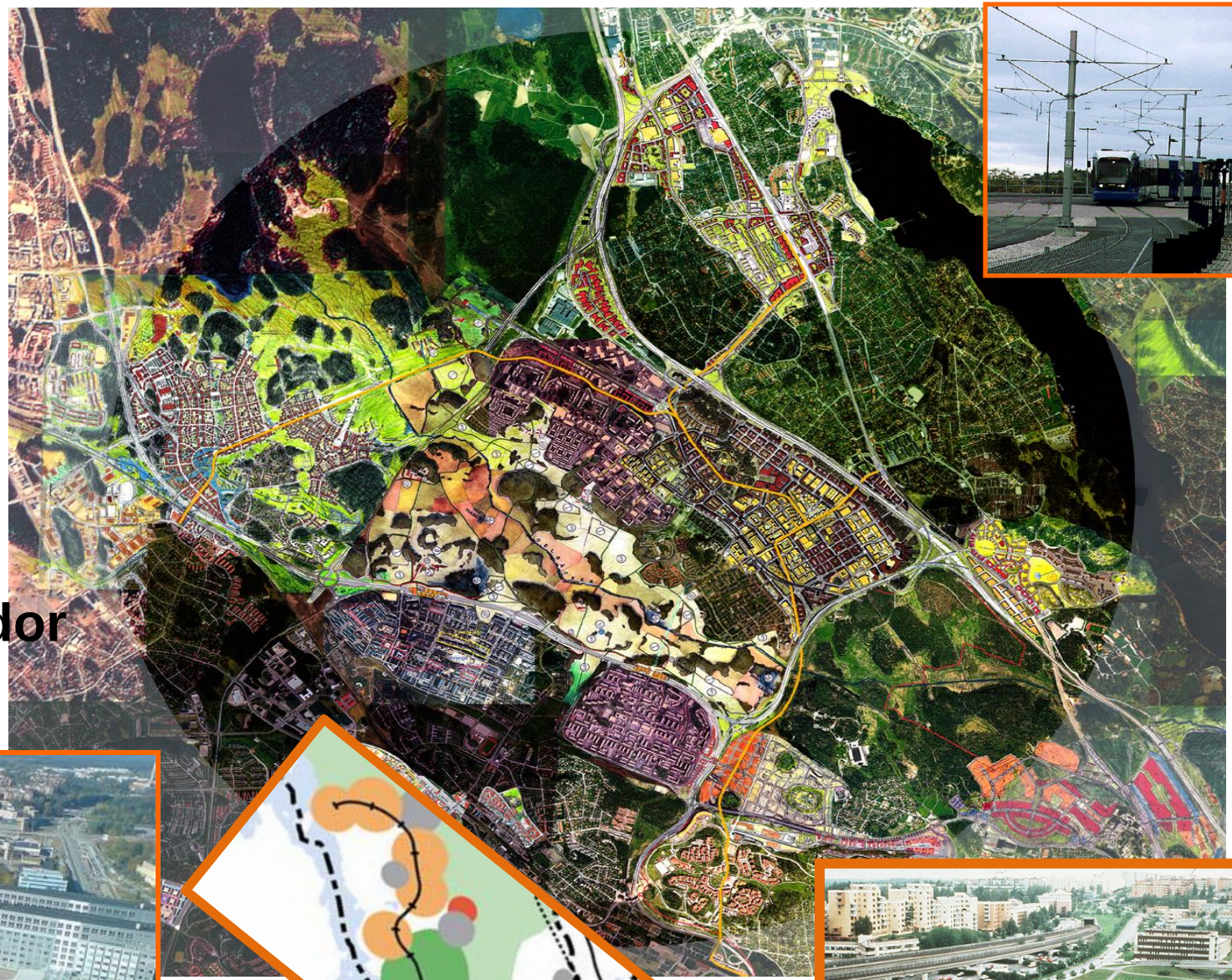
Kista Science City:

”Complete” Science City to work, live, shop, learn, play.

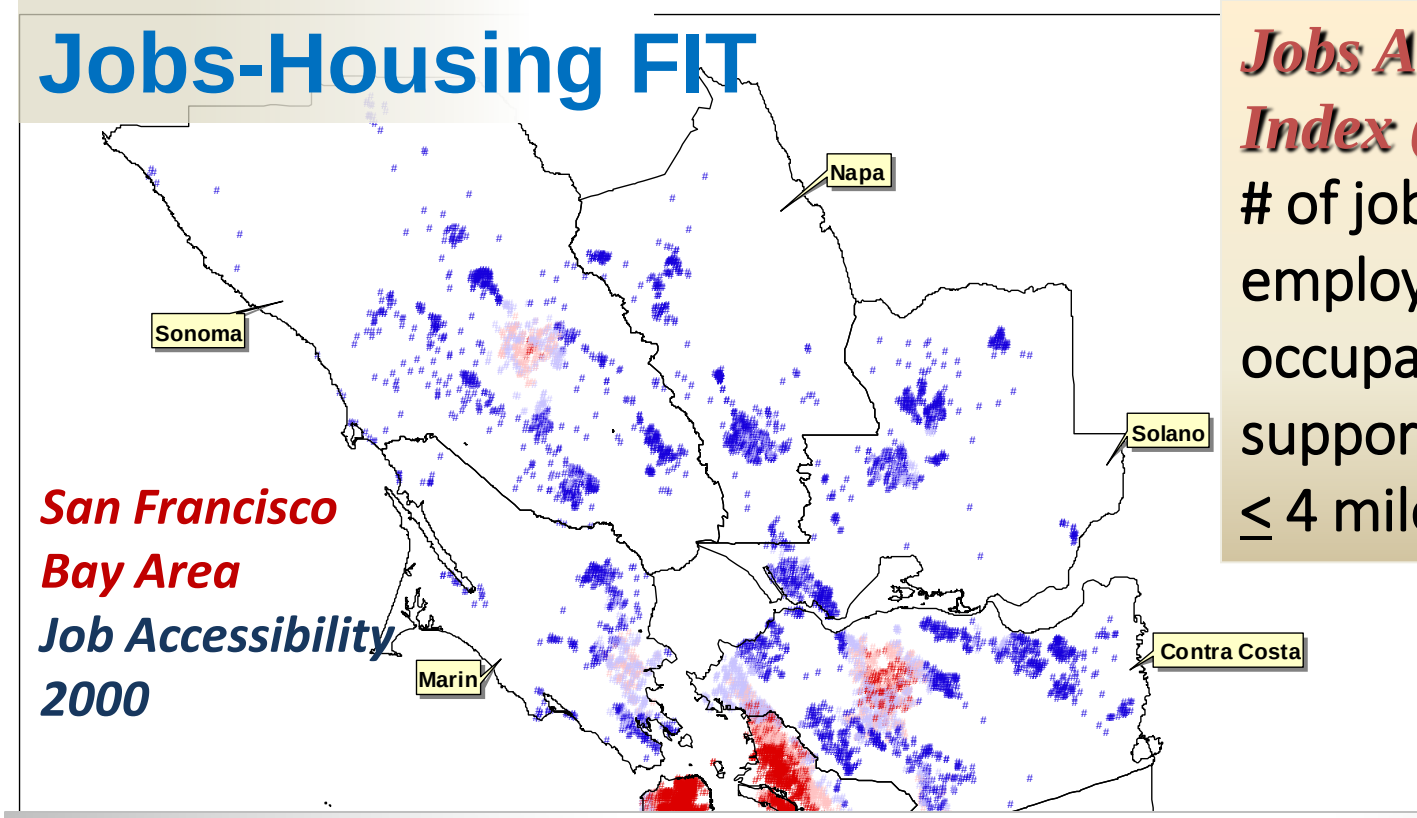
Employment Self-Sufficiency

= 40% in city;

68% on rail corridor

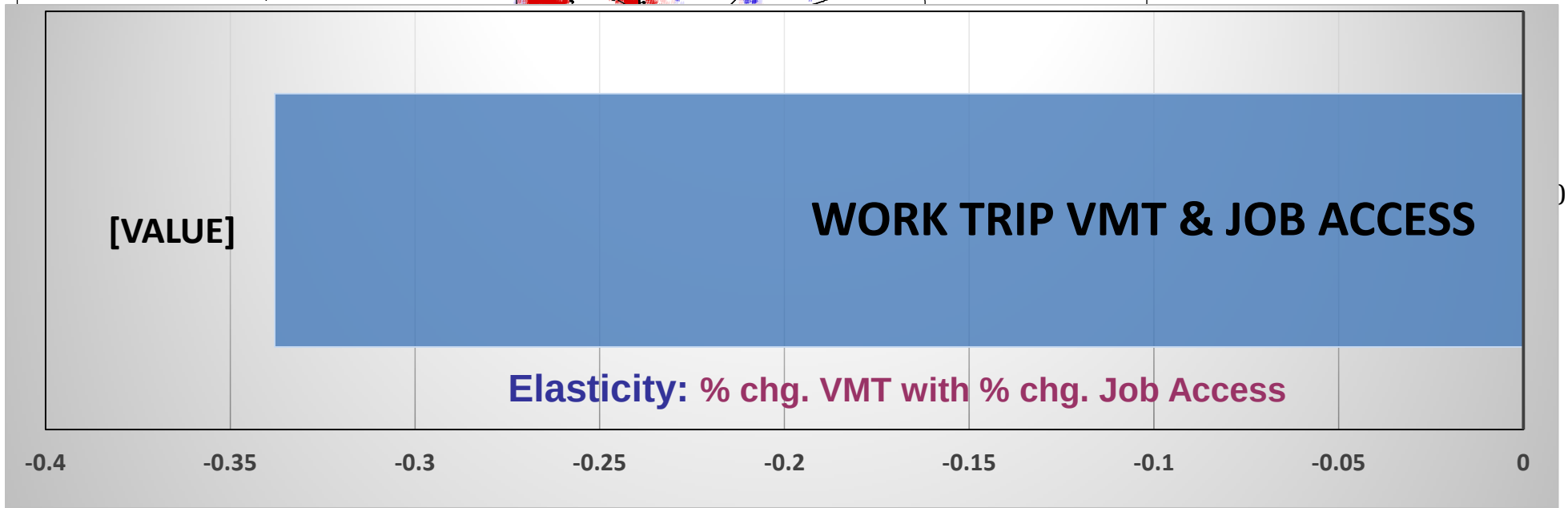


Jobs-Housing FIT



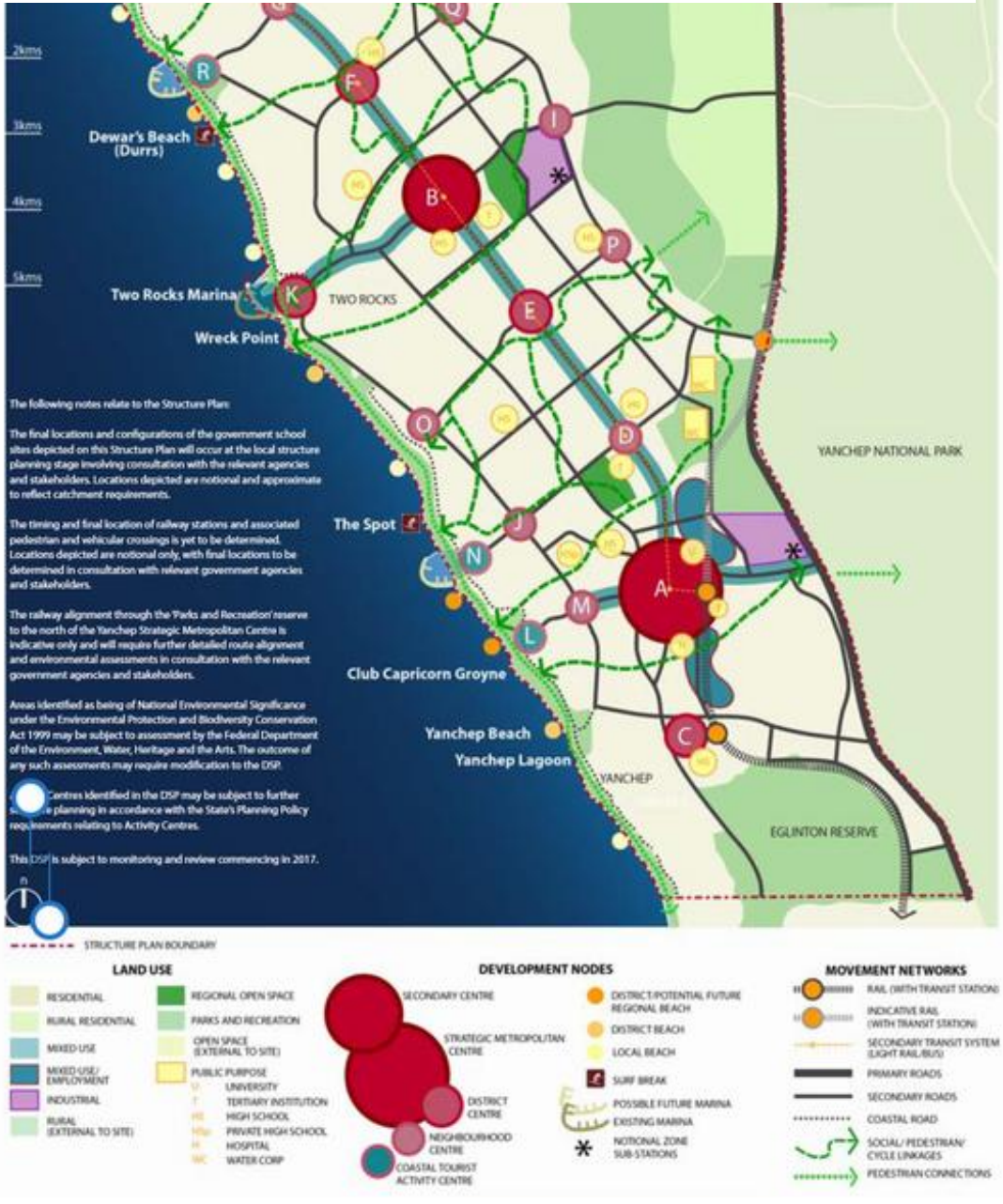
Jobs Accessibility Index (OM) =

# of jobs in employed-resident's occupation (exec/prof; support/service; blue collar) ≤ 4 miles



Yanchep – Two Rocks District Structure Plan

MIXED-USE CENTERS



Mixed-Use Activity Centres

A City Centre

Mixed-Use Transit Corridor

Mixed-Use Employment Area

Residential Neighbourhoods

Open Space

Land-Use Diversity

Advantages of Mixed Uses:

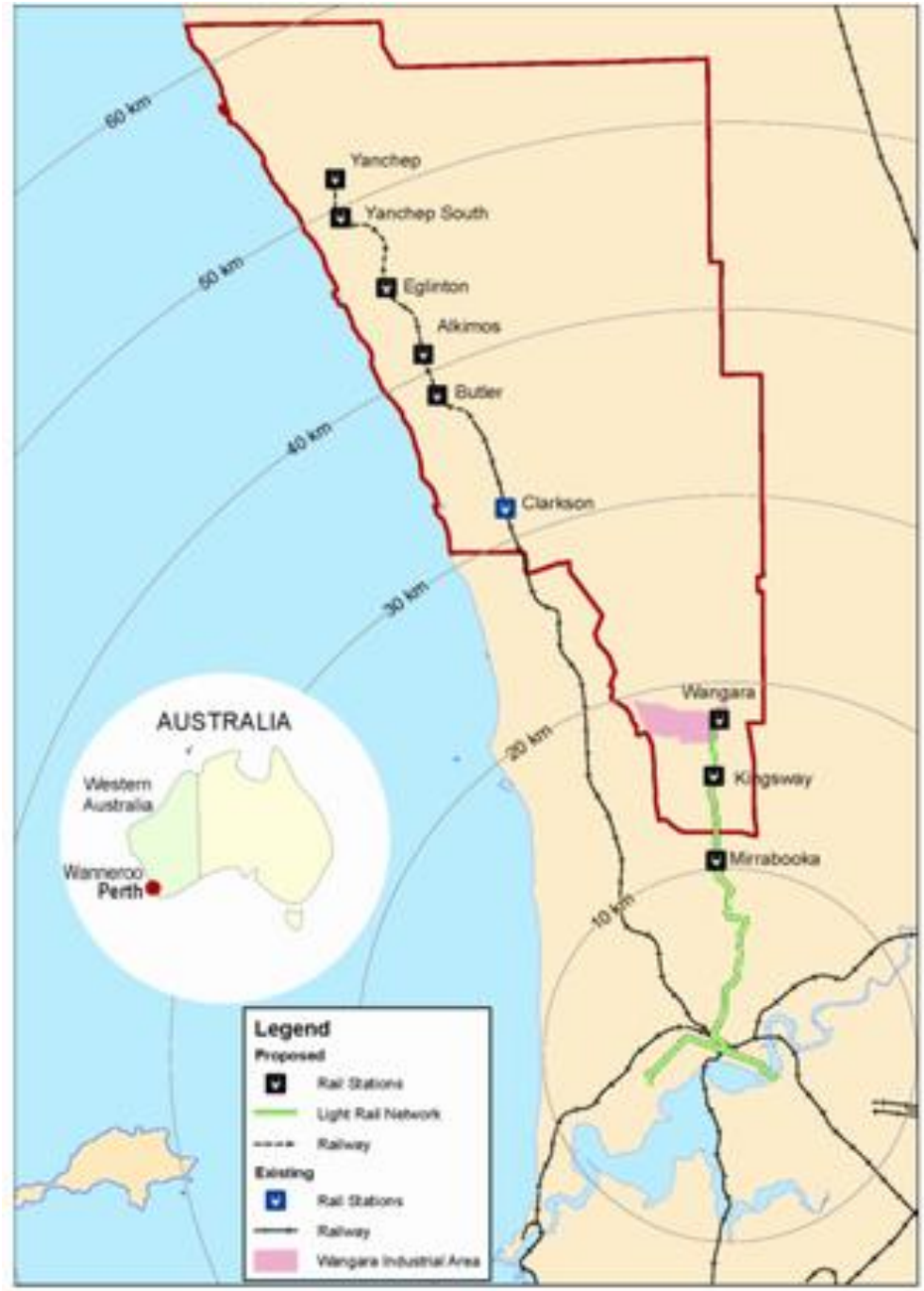
- Internalizes/Shortens Trips
- Consolidates Trips – "Trip Chaining" / One-Stop Shopping
- Spreads trips throughout day/ week – activates/invigorates places; natural surveillance
- Allows shared parking

Stepped-Up Mobility Role for Public Transport

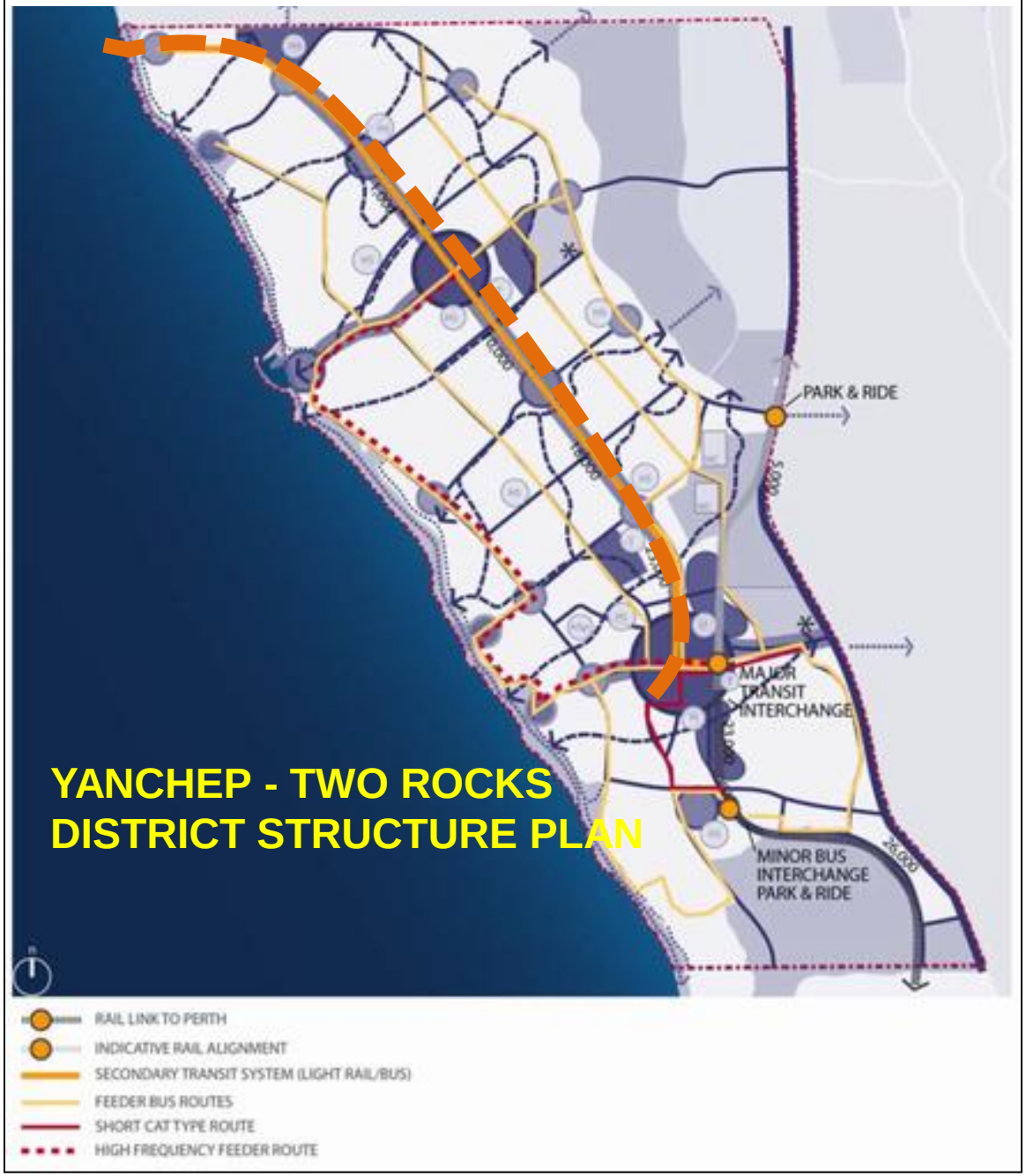
Heavy & Light Passenger Rail Service in Perth's Northwest Sub-Region

Under Consideration:

- **13.6 KM Heavy Railway Extension to Yanchep**
- **LRT to Wangara**
- **LRT/BRT linking centers**



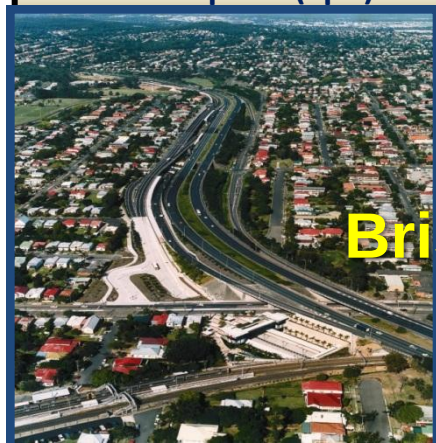
Expanding Public Transport to New Urban Centers

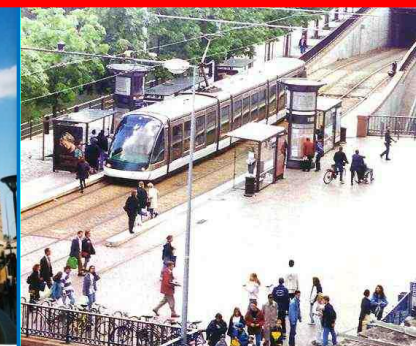


Three main elements are:

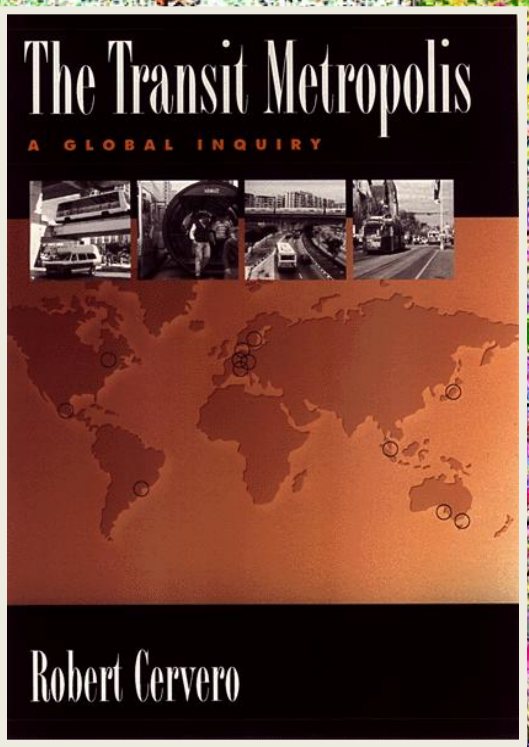
- Extension of the Perth **Metropolitan Rail System** to the Yanchep-Two Rocks area;
- A **Surface Light Rail, Streetcar or Bus-way system** linking the Strategic Metropolitan Centre with the Secondary Centre and the northern coastal village;
- An **Integrated Feeder Bus System** linking residential neighbourhoods to the activity centres and to the

	BRT	Urban Rail Transit	
		Light Rail/Tram	Metro
Rights-of-Way	Mixed: shared (at-grade); dedicated and exclusive lanes	Exclusive (elevated or barriers) or shared (at-grade)	Exclusive, grade-separated
Running Ways	Pavement; roadways	Steel Track	Steel Track
Vehicle Propulsion	Internal Combustion Engine	Electric (overhead wires)	Electric (high-voltage third rail)
Vehicle Control	Operator/Visual	Automated/Sign Control	Automated/Sign Control
Construction Time	1-2 Years	2-3 Years	4-10 Years
Maximum Capacity (passengers/vehicle unit)	160-270	170-280	240-320
Maximum Capacity (passengers/coupled unit)	160-270	500-900	1000-2400
Minimum Headway (seconds)	12-30	75-150	120-150
Line Capacity (passengers/direction/hour)	5000 - 45000	12000 – 27000	40000 - 72000
Maximum Speed (kph)	60-70	60-80	70-100
	8.4	21.5	104.5



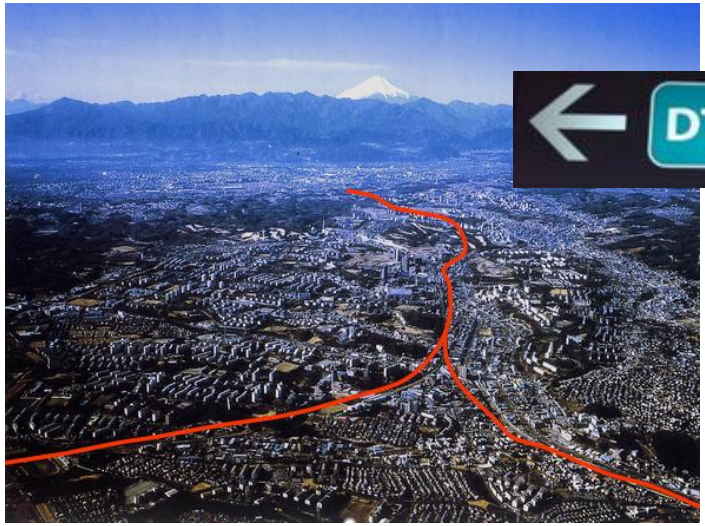


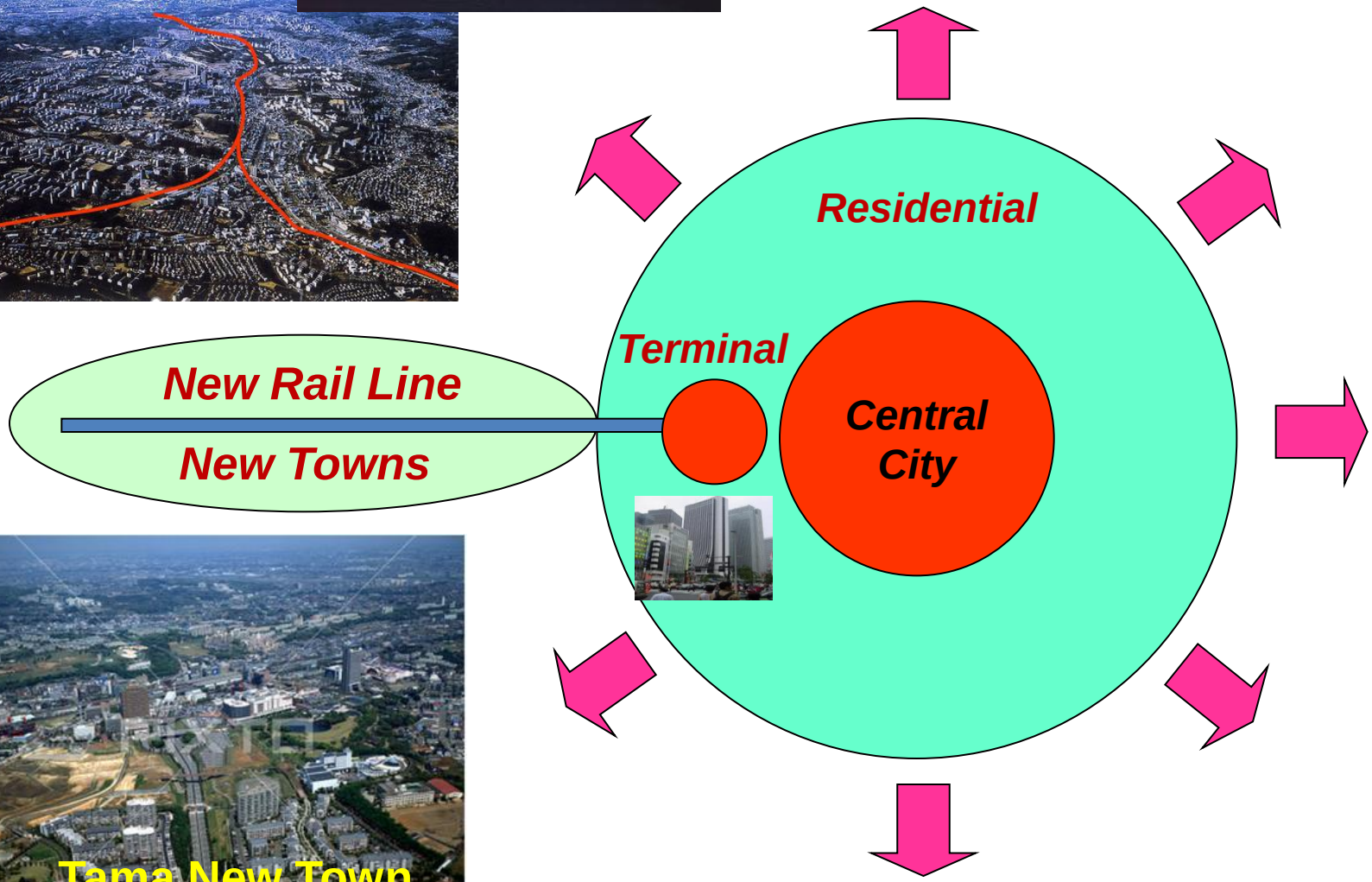
Greater Tokyo: Entrepreneurial Transit



Tokyo's Private Suburban Rail Lines

Greater Tokyo: Regional Growth Strategy



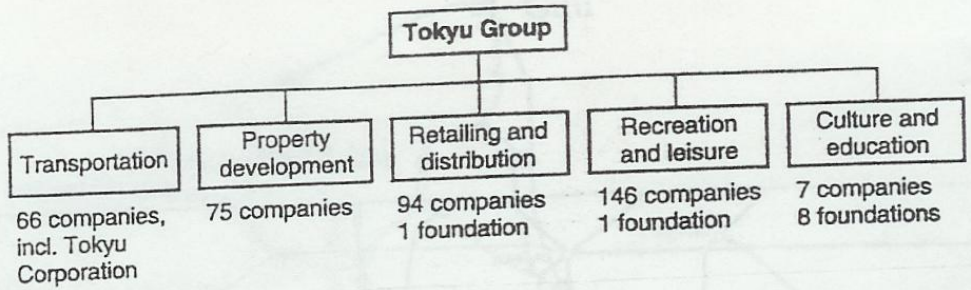


Tama Garden City

Private Railways

- **Powerful conglomerates** -- Tokyu, Odakyu, Keio, Seibu – built/own communities, practicing value capture in its purest form

- **Government facilitated by:**
  - Granting exclusive franchises
  - Regulating fares, prompting companies to venture into other businesses



TYPES OF BUSINESSES OPERATED BY RAILWAY CONSORTIA AND THEIR AFFILIATED COMPANIES

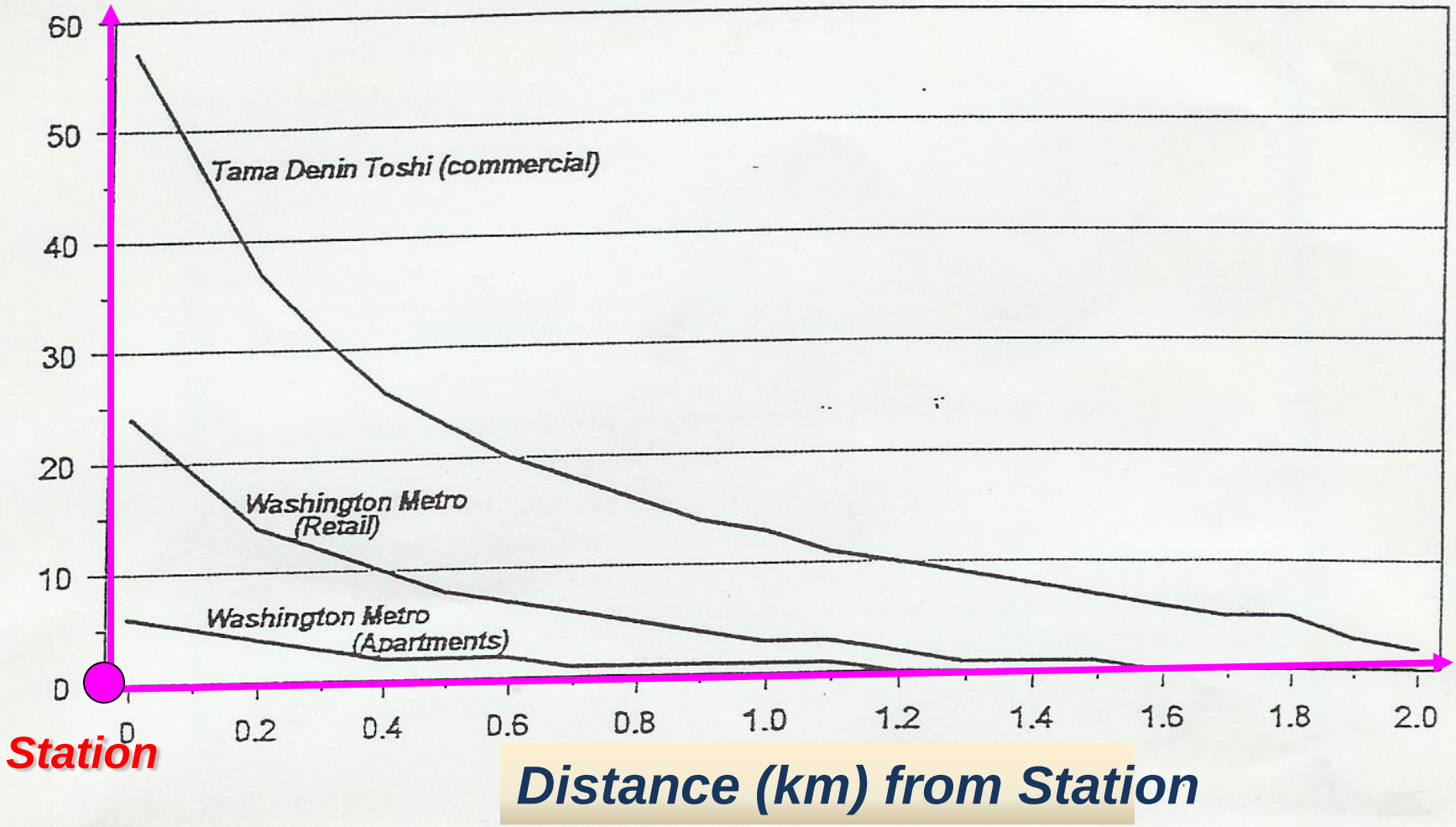
The following represents the kinds of business activities typically pursued by large Japanese railway companies:

Business	*Range of Activities*
Transportation	Railway operations; bus services; taxi services; car rentals; trucking; aviation; shipping; freight forwarding; package delivery; manufacturing of rolling stock.
Real Estate	Construction, sale, and leasing of housing, office space, hotels; architectural and engineering services; landscaping.
Retailing	Construction and operation of department stores, supermarket chains, station kiosks, catering services, and specialty stores.
Leisure and Recreation	Construction and operation of resorts and spas, amusement parks, baseball stadia, multiplex movie theaters, fitness clubs, golf courses; operation of travel agencies.

Aobadi Station: Tama Denen Toshi Line

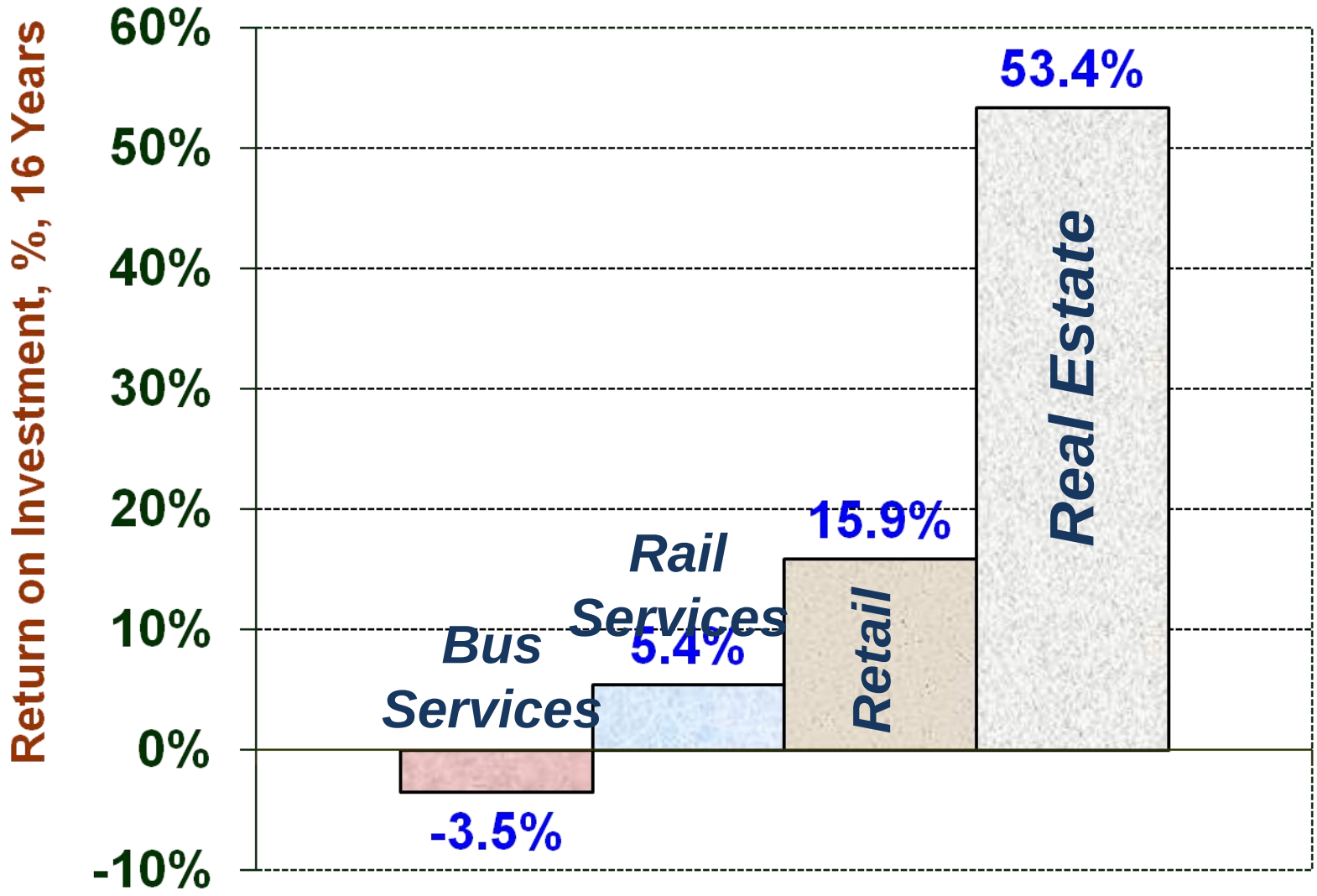
Value Capture

% increase in land values (premium from proximity)



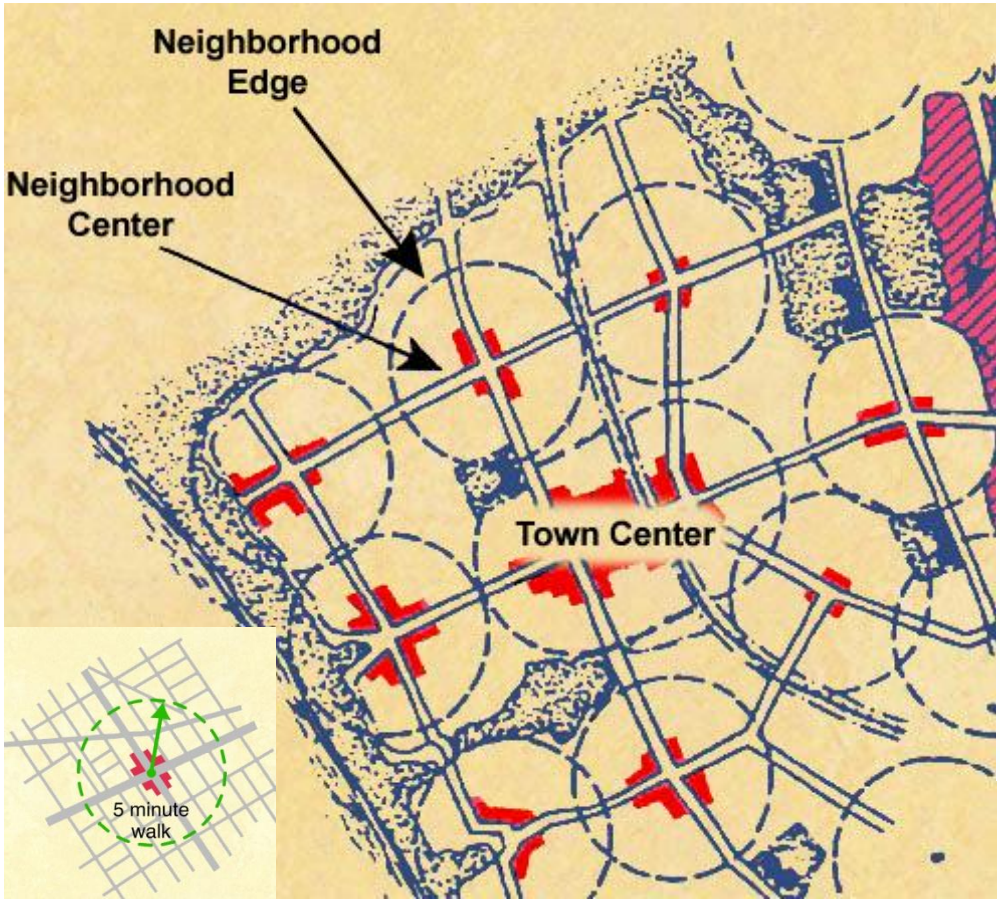
R. Cervero, Transit Values, 1996.

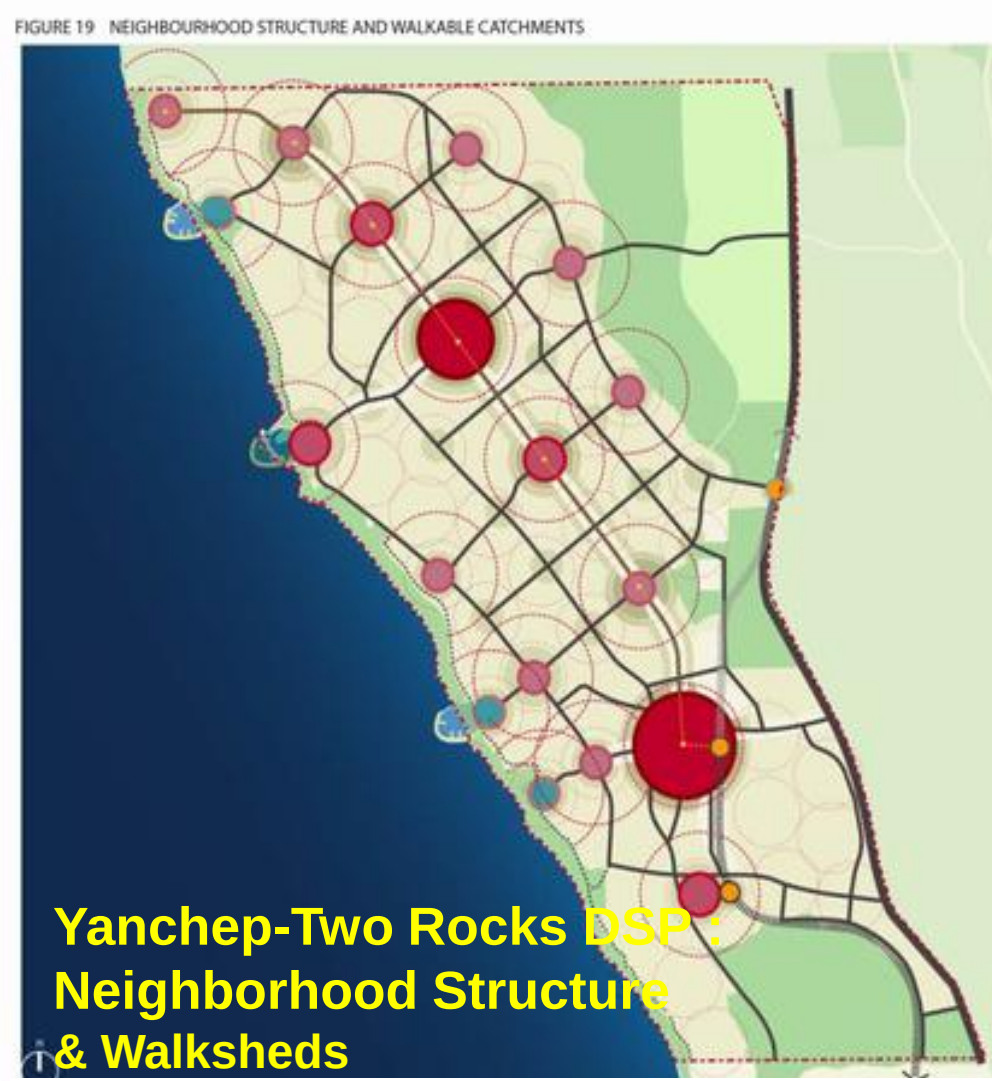
Rates of Return by Railway Corporations in Metro Tokyo
1980-1996



The Neighborhood Scale

Attractive neighborhoods have a center and an edge. ***The center should be a public space, whether a square, a green, or an important intersection.***

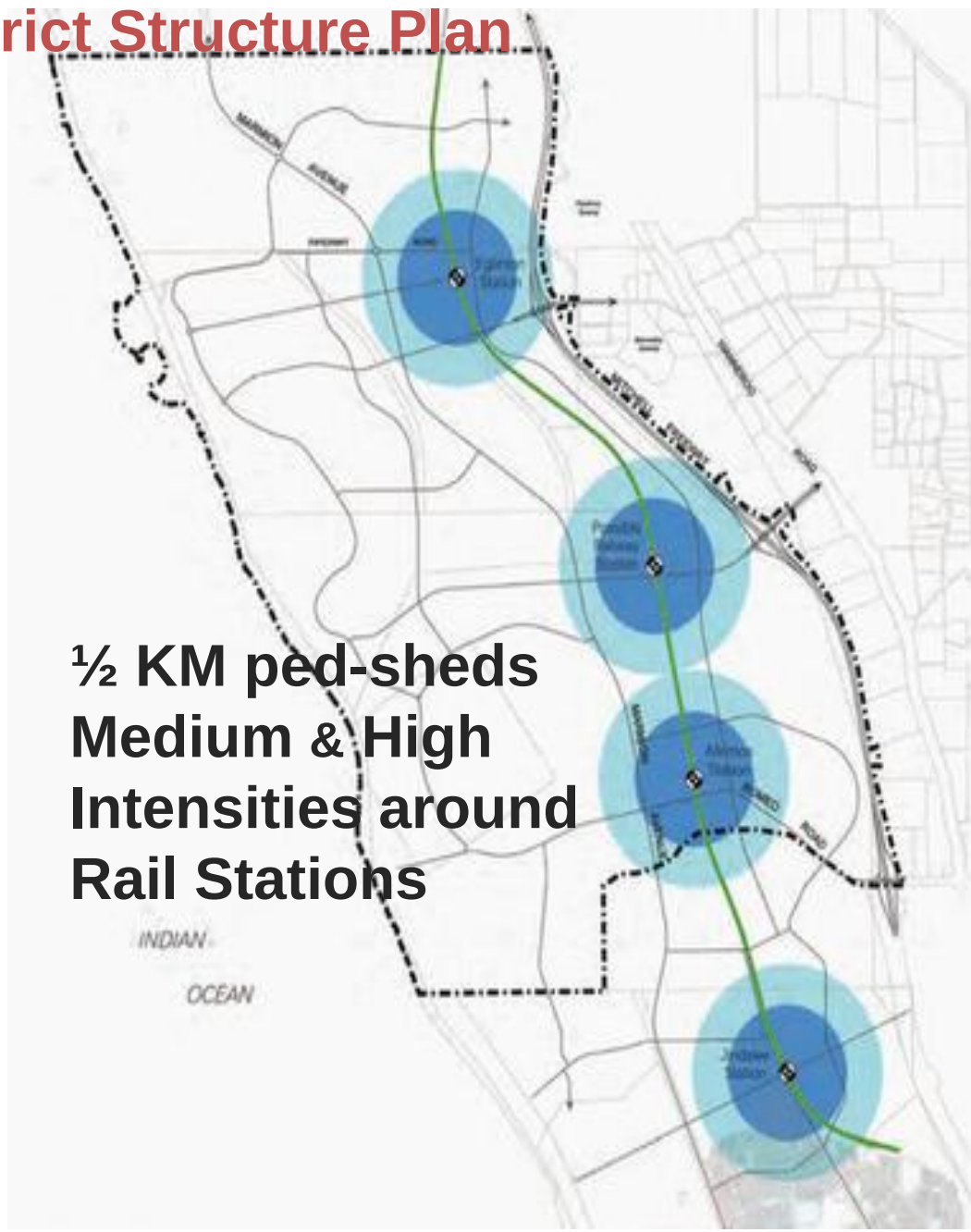




Complete Communities: Live-Work-

Alkimos Eglinton District Structure Plan
December 2010

Transit-Oriented Development



½ KM ped-sheds
Medium & High Intensities around Rail Stations

Transit Oriented Development (TOD)

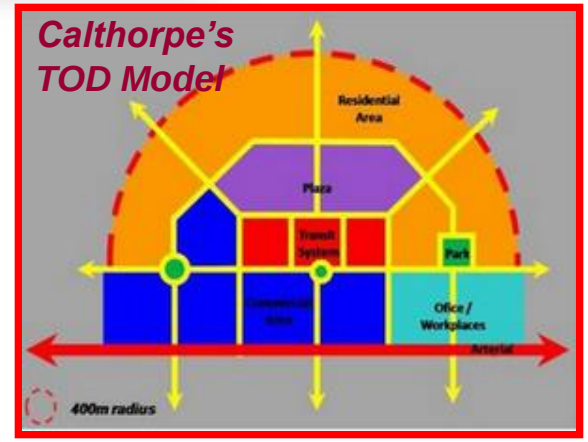
Reduce car-reliance through:

- higher-density development,
- diversity of uses, and
- pedestrian-friendly design,
- within walking-distance of frequent transit
- employ demand management techniques.

- are really pedestrian-oriented communities connected by transit.

City of Vancouver's View on TOD

"A Place to Be… Not Just to Pass Through"



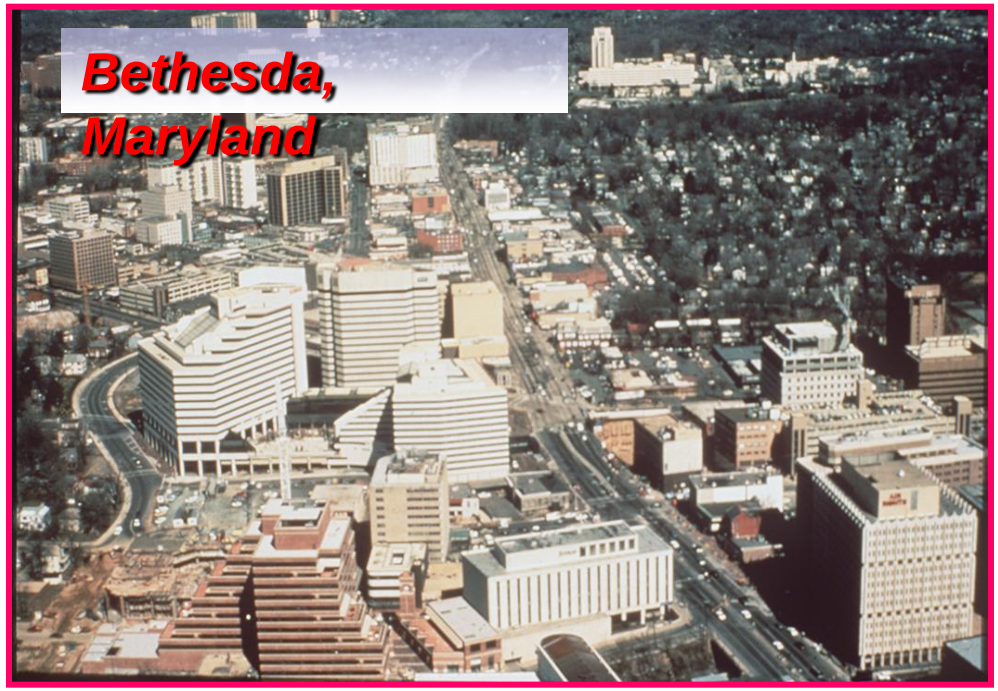
TOD & Travel

U.S. studies show:

Trip De-generation:

- ***10%-40% lower VMT/capita***
- ***15%-45% higher Transit Capture Rates***

❑ **Product of Self-Selection**



TOD/Station Design Challenge: Conflict of Place & Node

Place

- **Community Hub – Modern-day "Agora"**
- **Attractive Milieu** - Comfortable, Memorable, Accent on Aesthetics & Amenities, Connectivity, Legibility, Natural Surveillance, Distinctiveness
- **Design Perspective** – Architecture/Planning

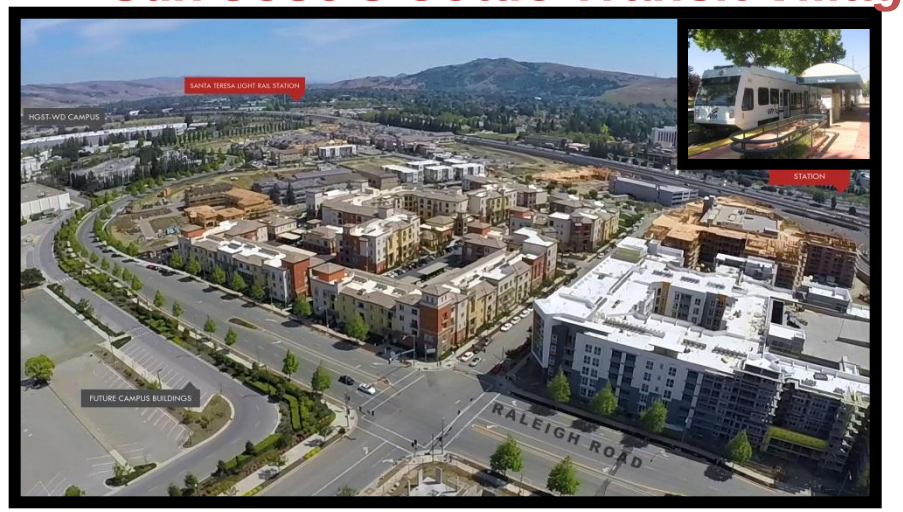
Node

- **Logistical Points** – Interchange for Parking, Bus, Paratransit, Kiss-&-Ride, Taxi, Bikes, Scooters, Pedestrians, Delivery Trucks
- **Conflict Points** - Safety
- **Design Perspective** – Engineering

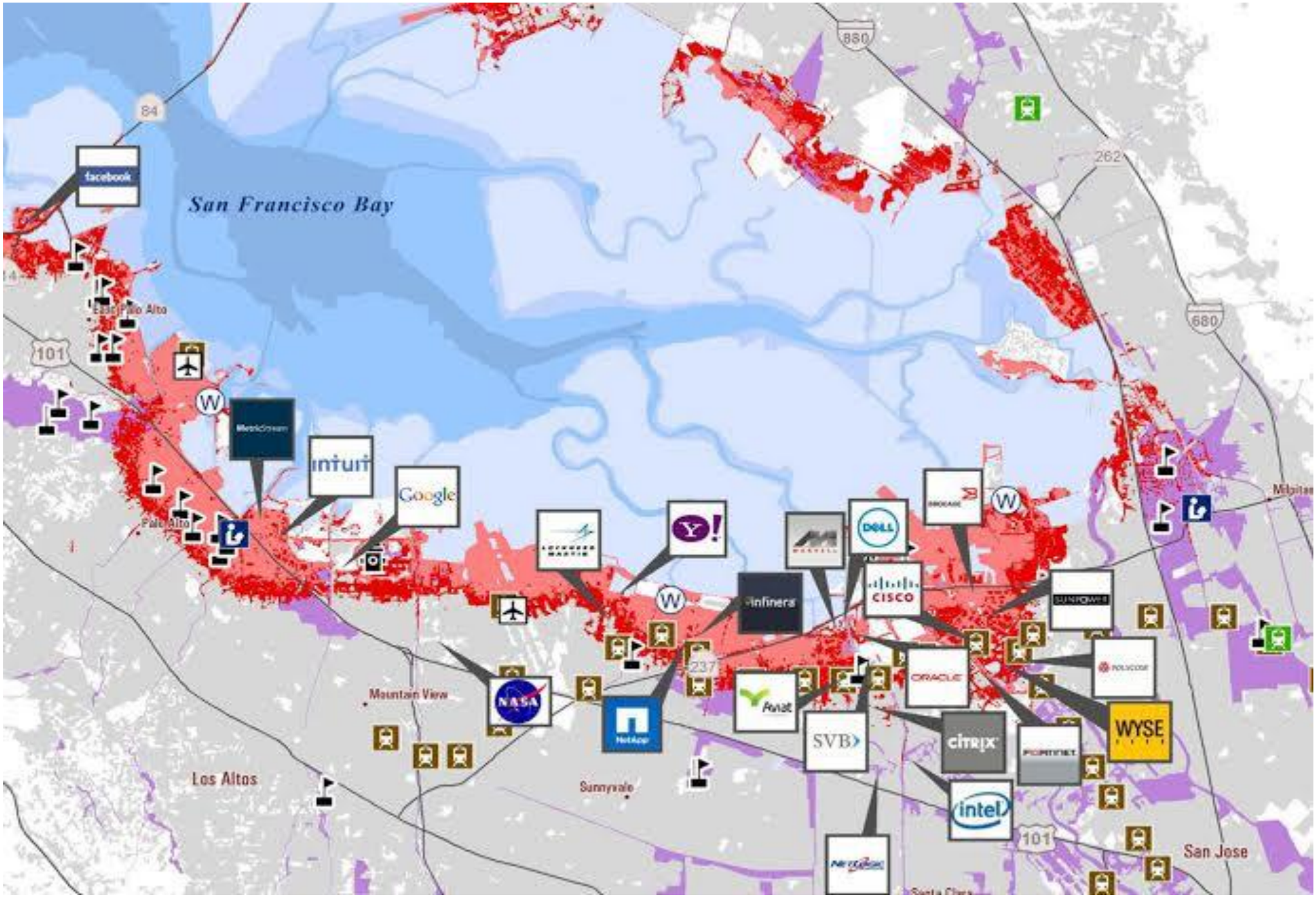
Santa Clara County: LRT Surrounded by Boxes & Pavement to Mixed-Use Centers

Tasman East Corridor Cisco Campus

San Jose's Cottle Transit Village



- **Infill of former IBM Campus**
- **'Right-size' HGST campus – two 4-story towers**
  replace boxes: "our employees do not want to be in a business park".
- **3 rail stops nearby – LRT & Commuter Rail**
- **2 commercial centers**


San Francisco Bay
facebook
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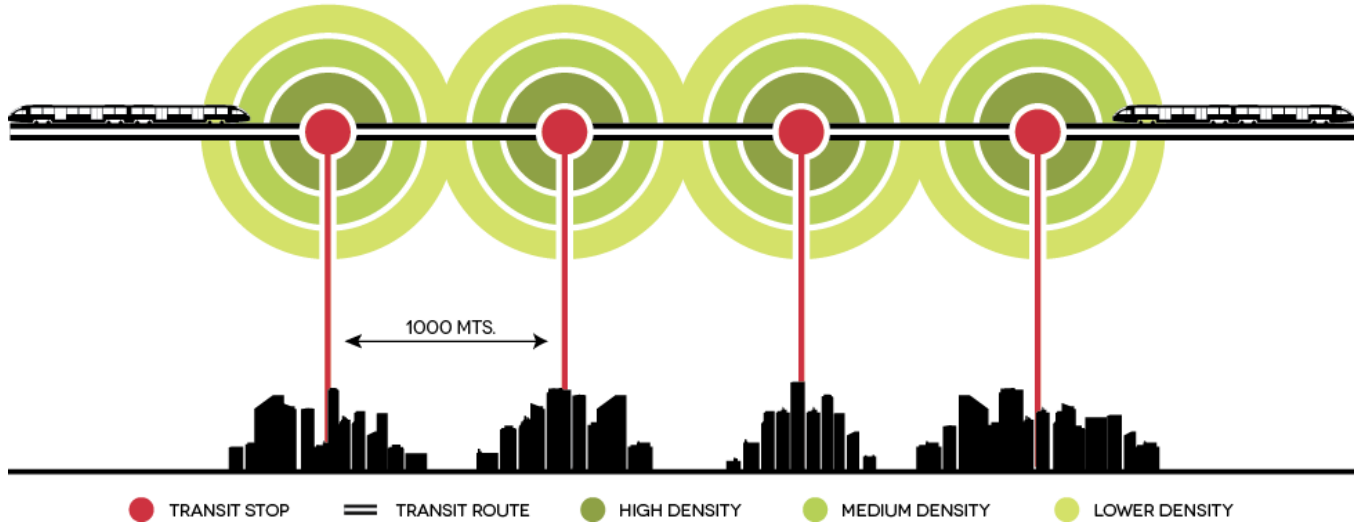
CISCO
ORACLE
SVB
citrix
WYSE
intel
NASA
NetApp
Mountain View
Los Altos
Sunnyvale
San Jose
Palo Alto
101
237
880
680
262
84

TOC (Transit Oriented Corridors)

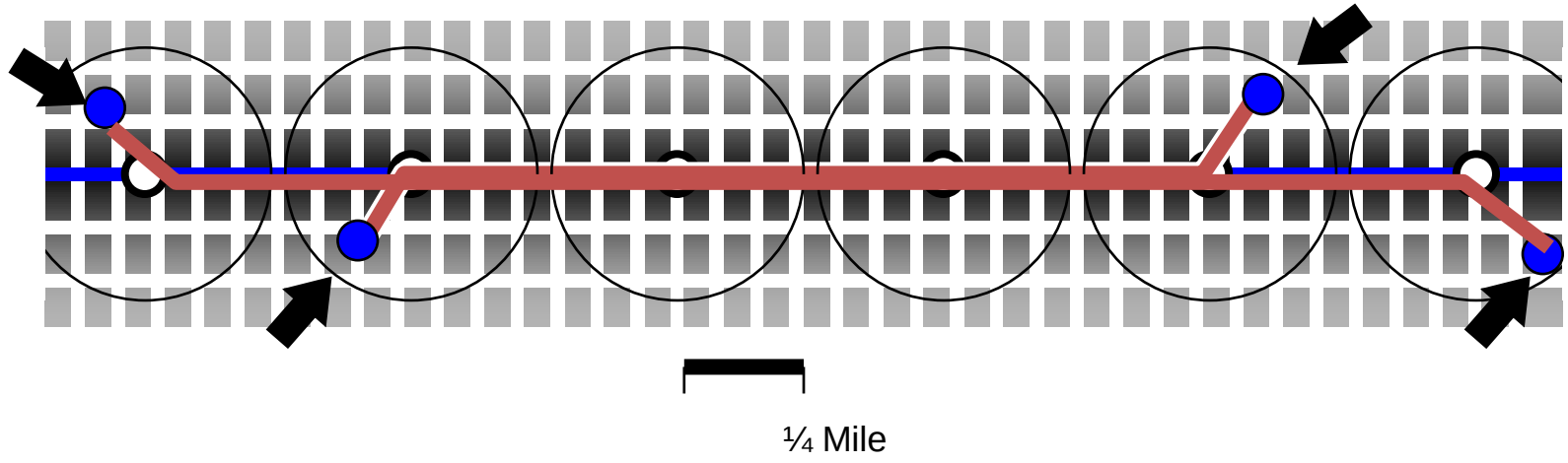


Arlington County
America's Success Story
TOC: Transit Oriented Corridor
"String of Pearls"

- VKT/capita of TOD Residents: 40% below regional average
- "Balanced Development" = "Balanced Flows"

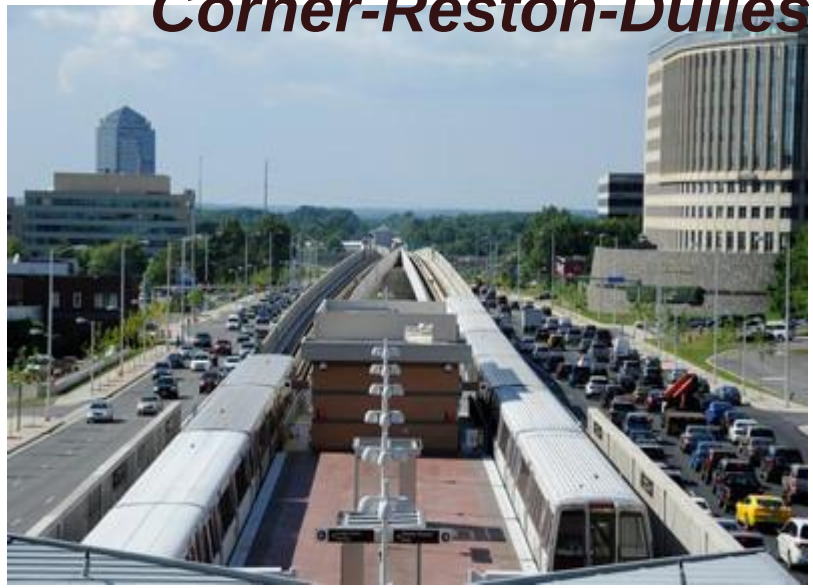
Compact, Mixed-Use, Ped-Friendly Corridors

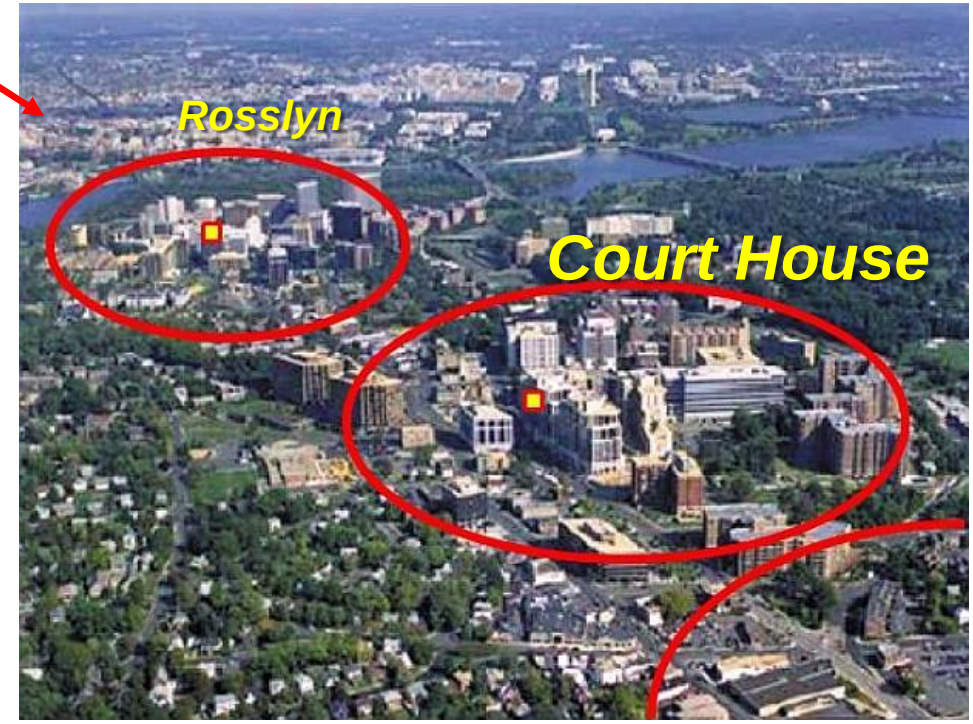
allow efficient 2-way travel flows



WASHINGTON METRORAIL

Silver Line to Tysons Corner-Reston-Dulles





SUBURBAN GRIDLOCK

Tysons Corner…the archetype of a hastily cobbled-together suburban downtown… poised for traffic nightmares

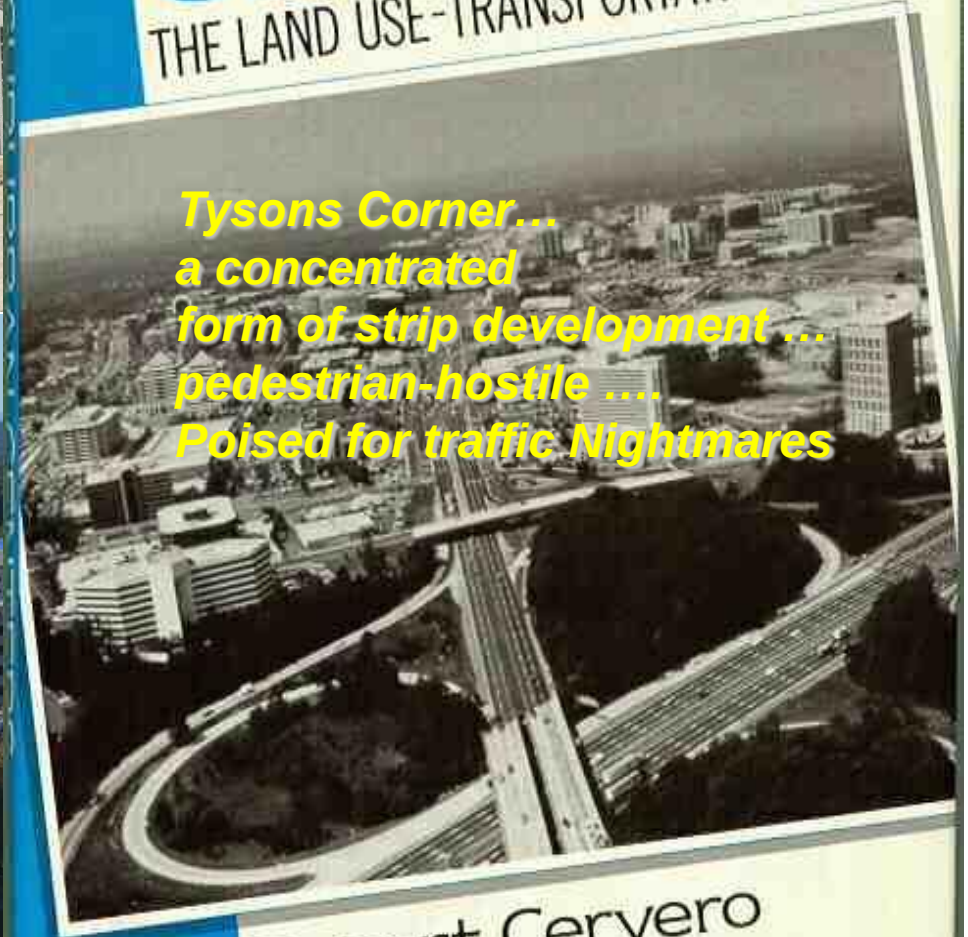
Robert Cervero

CENTER FOR URBAN POLICY RESEARCH

1986

AMERICA'S SUBURBAN CENTERS

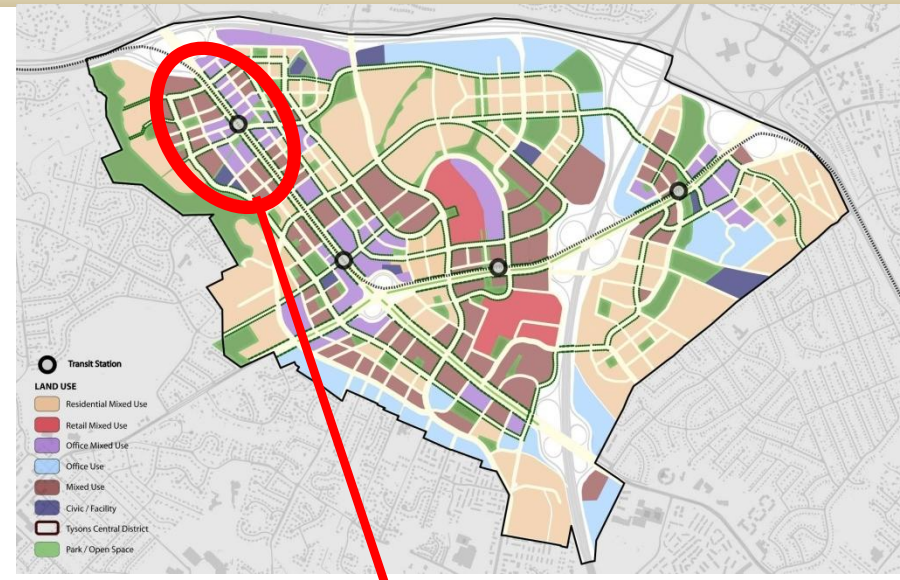
THE LAND USE-TRANSPORTATION LINK

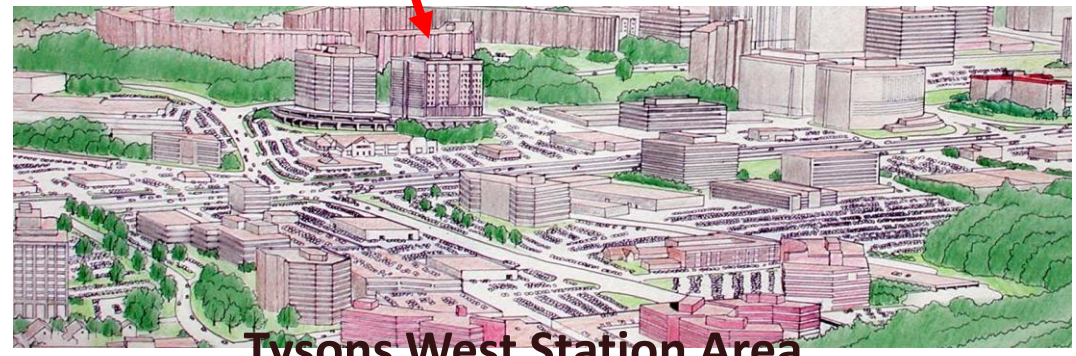


Robert Cervero

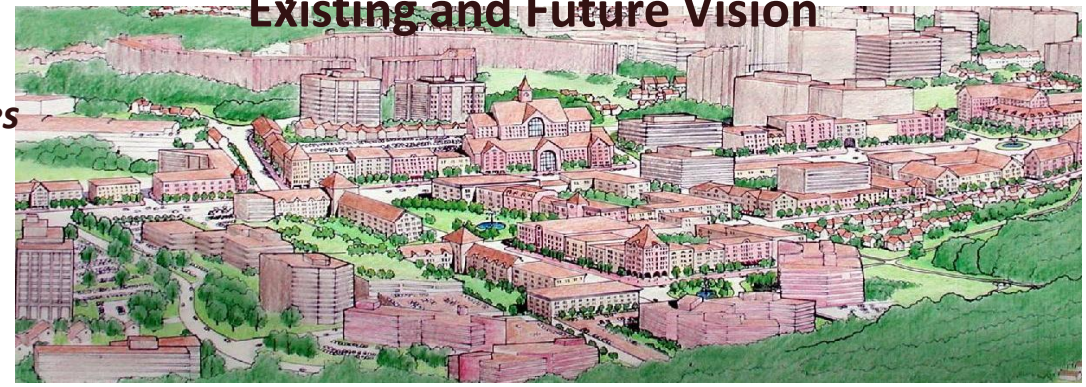
1989

Extending Metrorail to Tysons Corner: From Car-Oriented Edge City to Mixe





Tysons West Station Area
Existing and Future Vision



- *95% of growth < 3-min walk of transit*
- *Doubling of office space by 2030, to 84 mil sf in LEED silver bldgs over 1,700 acres*
- *Quadrupling of residential population*
- *F.A.R. bonuses for affordable housing,*
- *Minimum 20-acre parcel consolidation near stations to allow for street grids*

Tysons II at Tysons Central 123 Station
(approved development with rail-related density bonus)

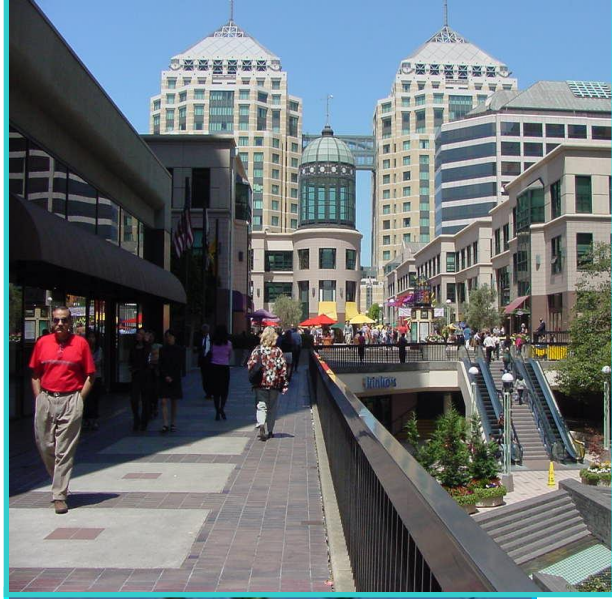
Commons of McLean: ***Marketed as "From Parking Spaces to Park Spaces"***

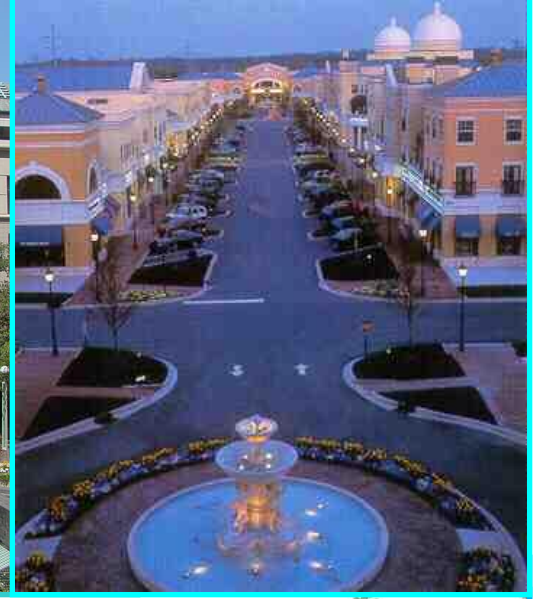
Livability - Place-making

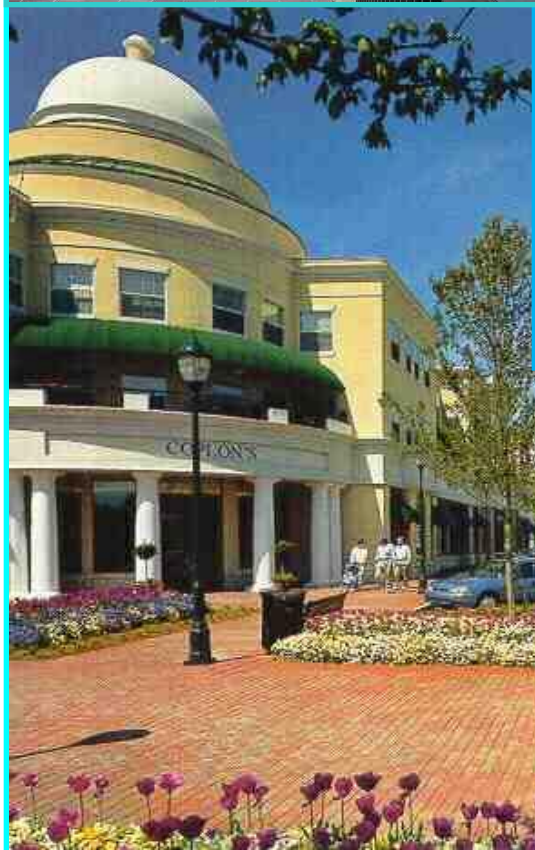
YANCHEP - TWO ROCKS
DISTRICT STRUCTURE PLAN
NOVEMBER 2010

- The vision for Yanchep – Two Rocks is to deliver the **highest quality**
  of urban form

- An important project focus of the Yanchep - Two Rocks development
  is on ***creating communities*** -- heighten the community's enjoyment of the urban environment by introducing informal and formal '**social places'** in the urban streetscape design with mixed uses, nodes of density and activity in a safe and easily acc







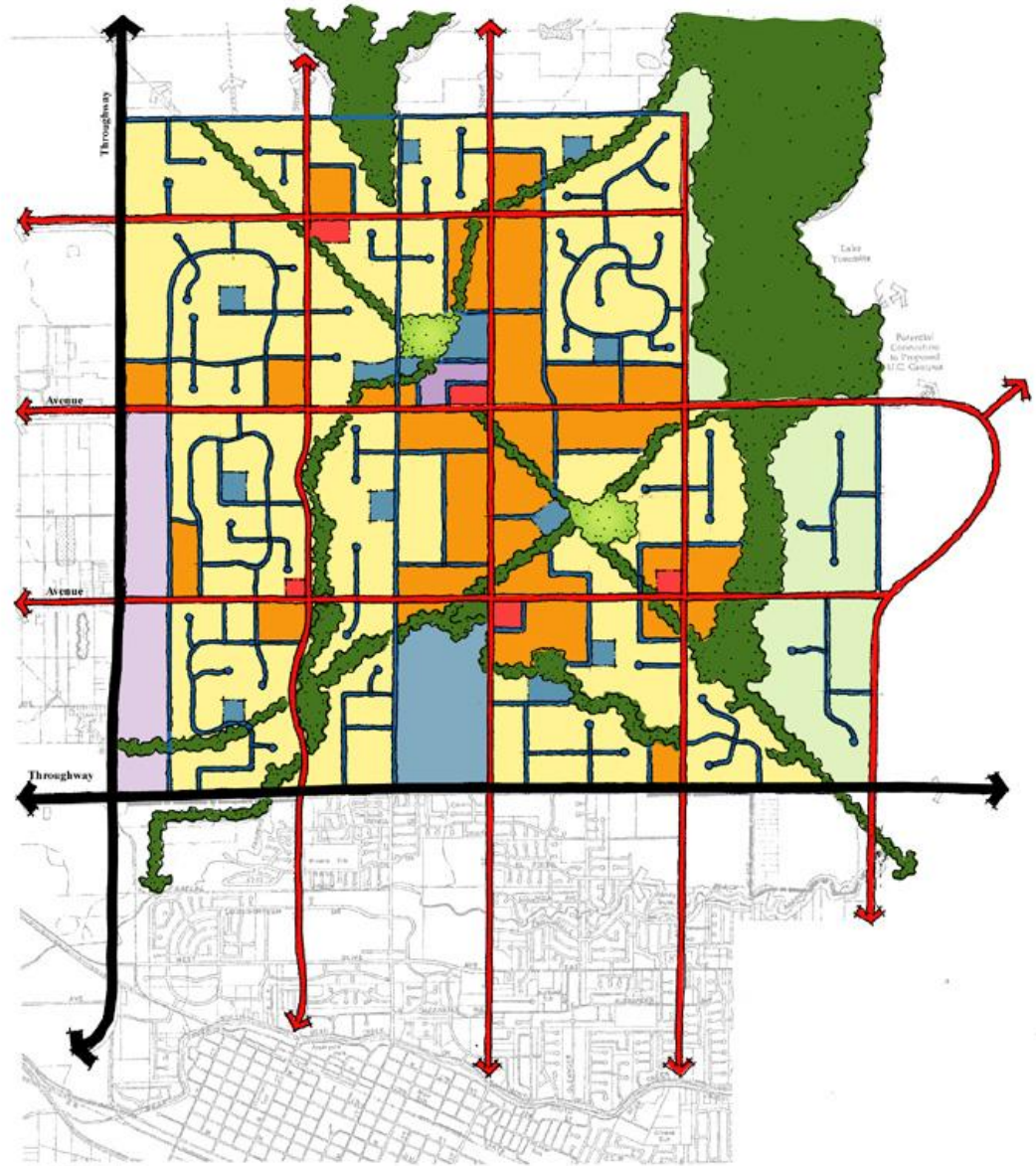
DESIGN

Place-making/Public spaces: memorable – distinctive

"Soften" perceptions of densities

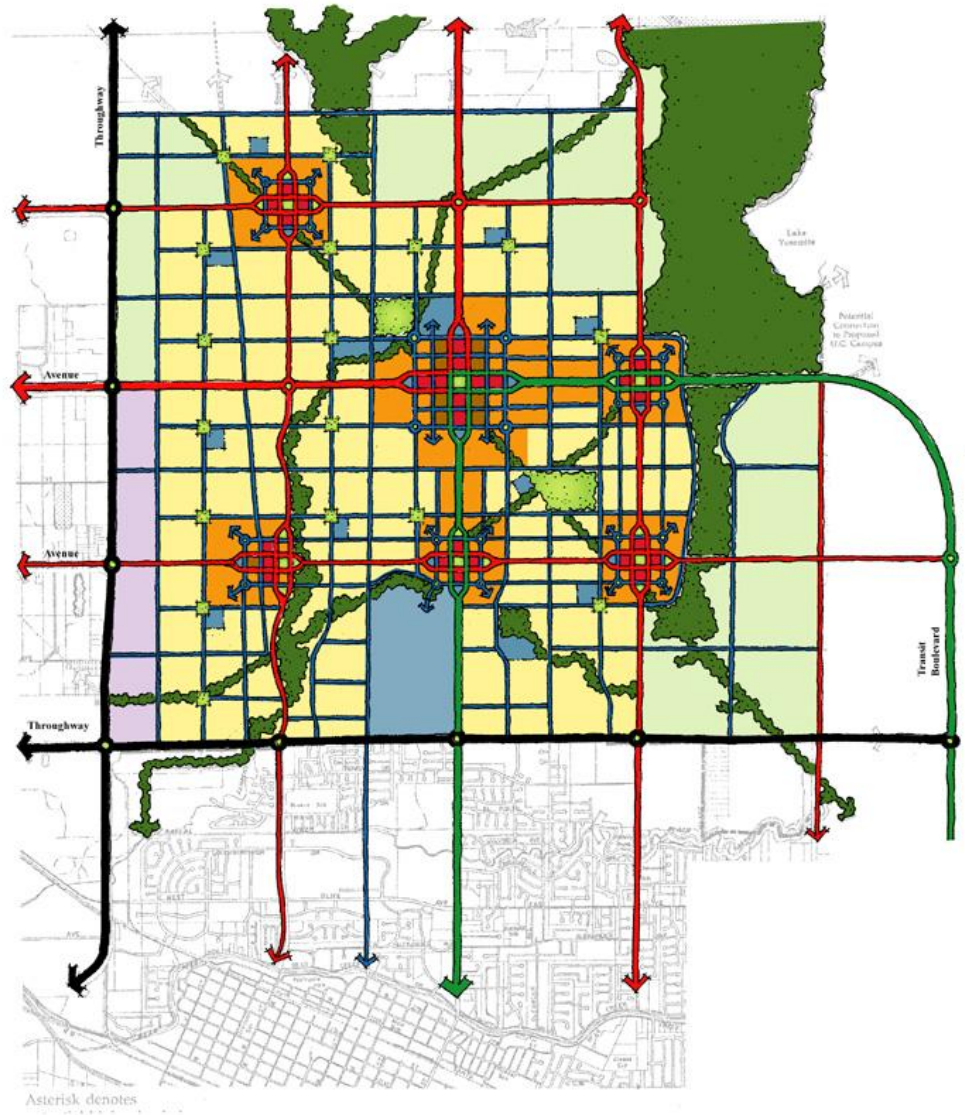
Build Social Capital

Conventional Street Network



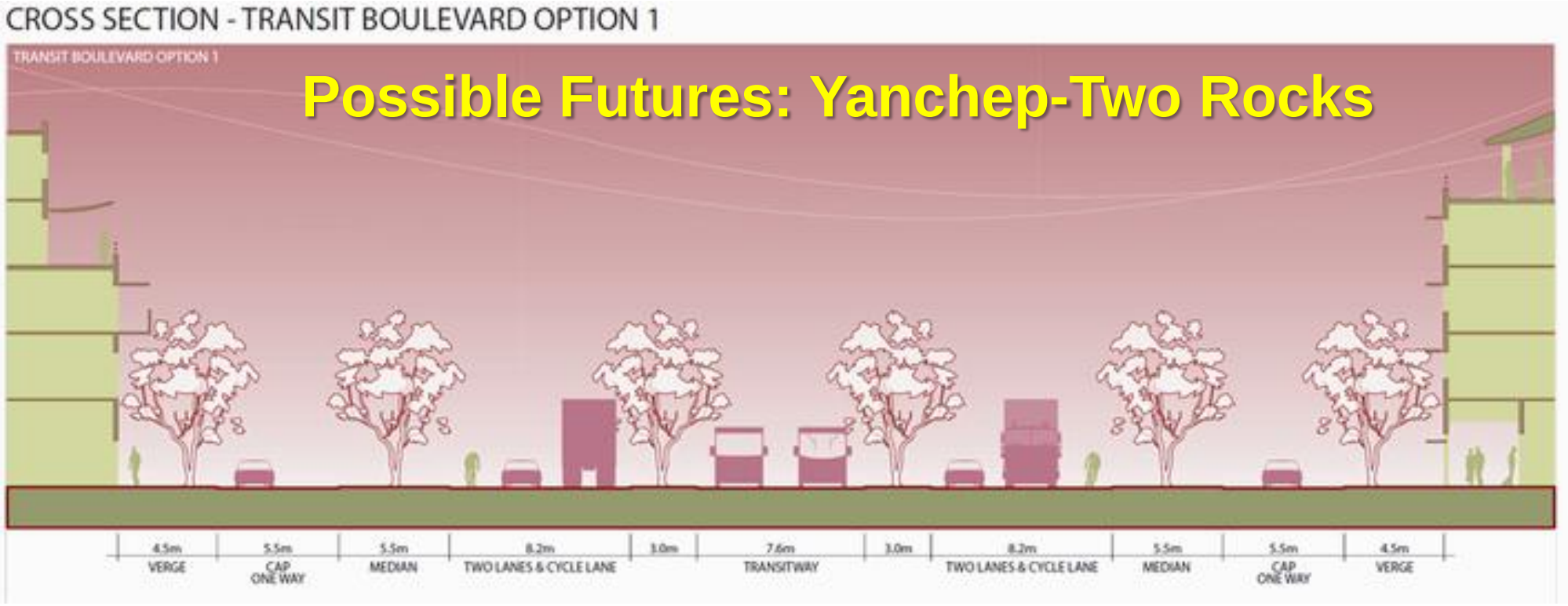
Connected Street Network

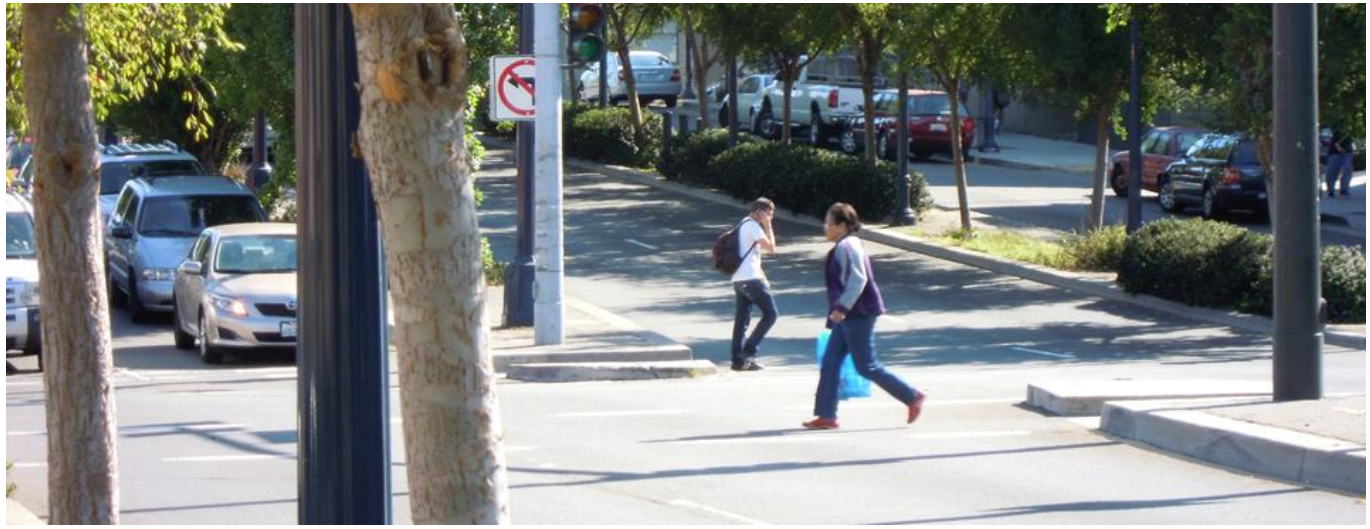
- *Avenues and Boulevards for regional travel*
- *"Connector" streets link neighborhoods to centers*
- *Traffic calming along local streets*
- *Special intersection treatments*



Reduces VMT by 12-15% compared to conventional network

Possible Futures: Yanchep-Two Rocks





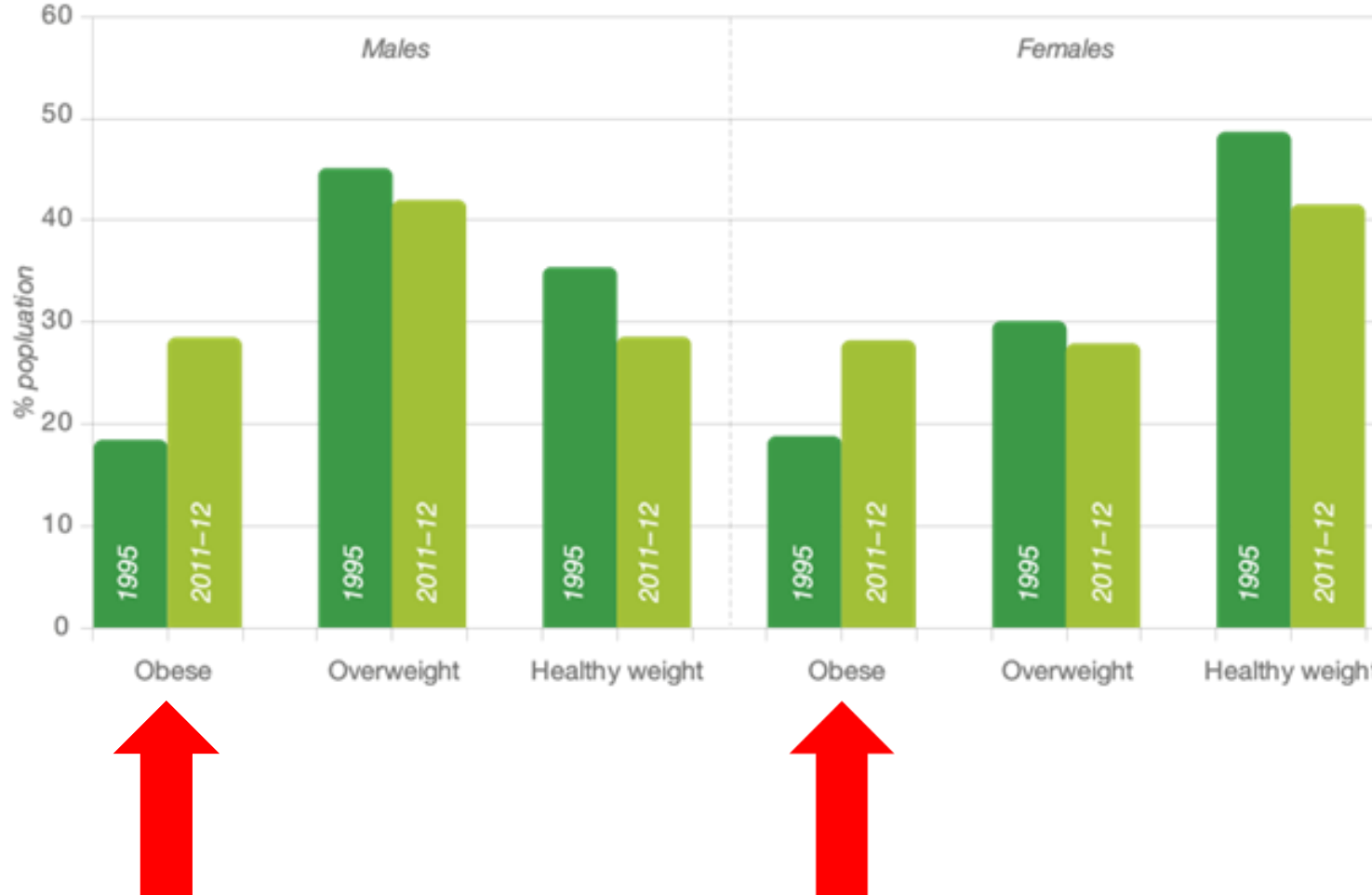
Octavia Boulevard, San Francisco

Proposed Pedestrian & Cycling Netwo

Alkimos Eglinton District Structure Plan December 2010

Obesity Trends among Australian Adults

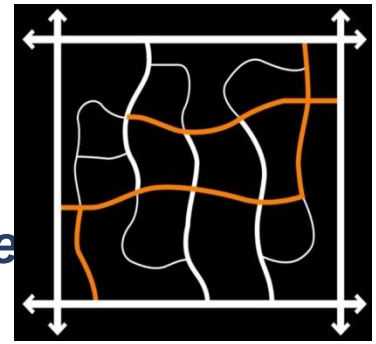
1995 National Nutrition Survey and 2011–12 National Health Survey
Australia Bureau of Statistics

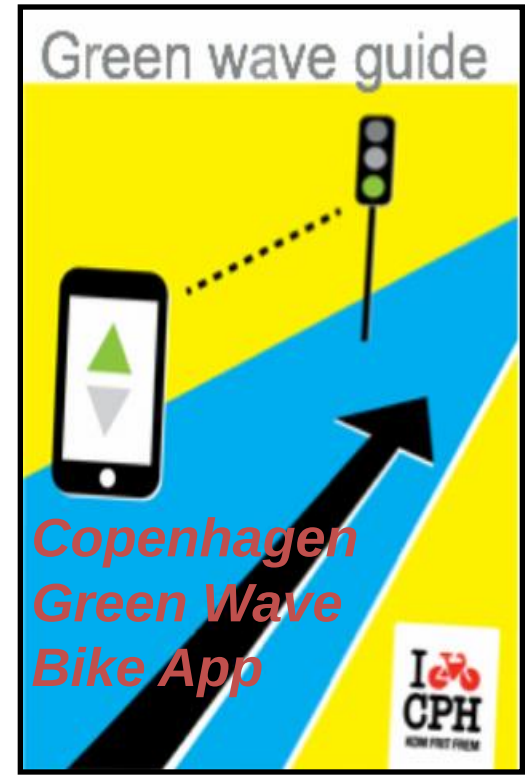


Encouraging Active Transport

Catalysts:

- ***High Connectivity***
- ***Cycling Infrastructure***





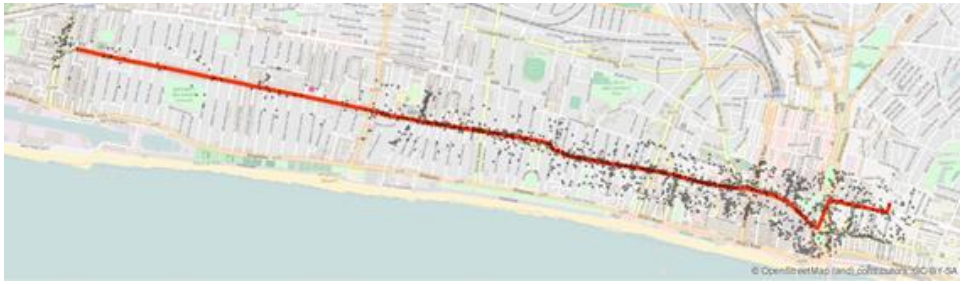
Encouraging Active Transport

Catalysts:

- ***Art; Aesthetics; Amenities – Green & Blue***
- ***Land-Use Mixes***

Sunflower at Portland Oregon Car-Free intersection

Study: Sidewalk conversations, photos, pause to admire & 'strangers chatting' increased to 32% of users vs. 7% at similar intersection w/o a Mural; Many cyclists took detours



FourSquare Venues (activity density on Bikeway in Brigh
Increased intermediate stop opportunities = increased bike commuting

The MILLENNIALS

- ***Shifting values and lifestyle preferences:***

  "Much of the money, time, excitement that previous generations directed at cars, Millennials direct at electronic devices (mobile phones, computers, sound systems)"

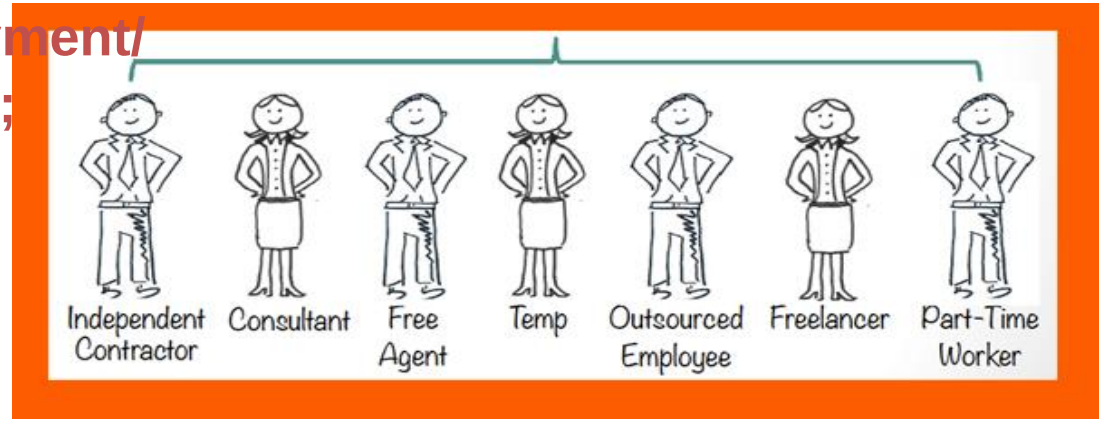
  (Sivak and Schoettle, 2014)

- ***Ownership to Sharing/ Communalism:***

  2 biggest assets (housing and transport)

- ***Walkable & Urban:*** housing & location preference for accessible, walkable, animated, connected places (3rd place); live-work-shop-play-learn places; Amenities: ACE

EMPLOYMENT: Contingent Employment/ Start-ups; Entrepreneurs; Freelancers; LinkedIn Networking



the HYBRID 935
CO-WORKING COMMUNITY

Employers/Retailers go where educated Millennials go:

Job growth in walkable, mixed-use areas with good transit; US: fastest (high-end) job growth has been in urban areas (reversing suburbanization trend)

Seattle: Tech firms moving offices from suburban office parks and campuses to mixed-use centers in CBD & high-amenity urban districts: **Amazon, Microsoft, Expedia.**

Expedia relocation from Bellevue "Edge City"
to
Seattle waterfront mixed-use neighborhood

Amazon: 3 Glass Spheres, with full-grown trees

Amazon: Dog Park on the 17th Floor

Development Activity within the Portland Streetcar Local Improvement Districts

January 2006

Portland Streetcar

- *2.4 mile line opened in 2001; extensions in 2006 added 1.6 miles*
- *$56.9 million cost, no federal funds.*
- *Modern low floor cars.*
- *In-street operation.*

Portland's "Green Dividend"

- Portland area residents travel 20% fewer miles every day
- $1.1 billion saved in transportation costs
- $1.5 billion saved in time (100 million hours less)
- $2.6 billion total - $$ freed up to support local economy
- Five times faster in-migration of 25-34 year olds than nation as a whole

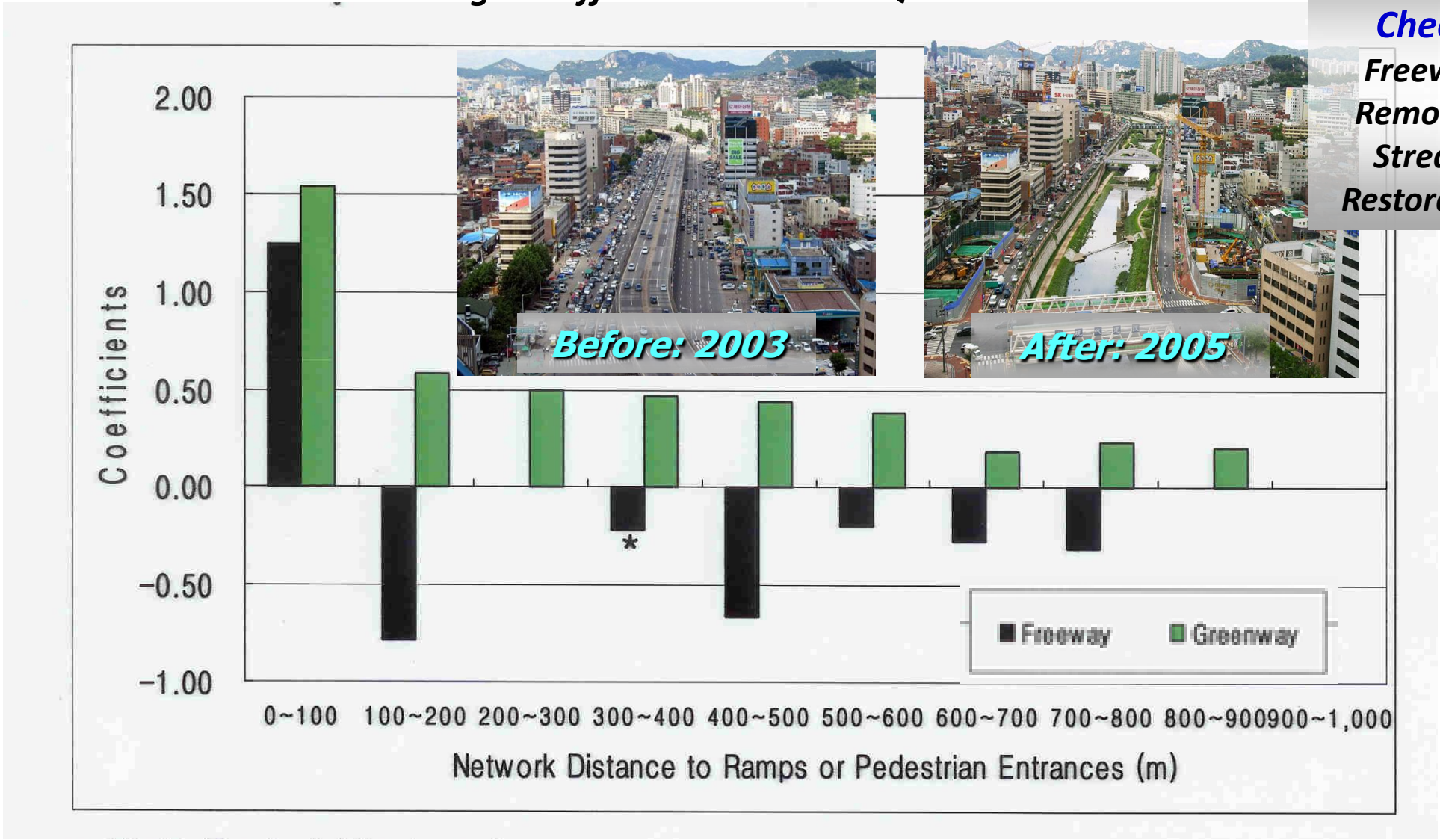
LIVABILITY/CREATIVE-CLASS DIVIDEND

Impact on Employment in "Creative Class" Sectors

Distance to Ramps or Pedestrian Entrances

Marginal Effects on Location Quotients

Cheong Gye Cheon
Freeway Removal/ Stream Restoration



R. Cervero and C. Kang, From Elevated Freeway to Urban Greenway: Land Value Impacts of Seoul, Korea 's CGC Project, *Urban Studies*, Vol. 46, No. 13, 2009, pp. 2771-2794

Re-thinking Mass Transit

Micro-Mobility

- ***Growth Market:***
  - ***Achieved Scale Economies***
  - ***UberPool in > U.S. 30 cities;***
  - ***> 50% trips in many cities; SF, LA,NY***
    >100,000 trips per week
- ***Transit Complement:***
  First/Last Mile connectivity
  - ***LA – 14% trips start/end at Metro***
  - ***SF – 10% trips start/end at BART***
- ***Hot Spots: operational efficiencies***

Dynamic Ridesharing

Lessons for Wanneroo?