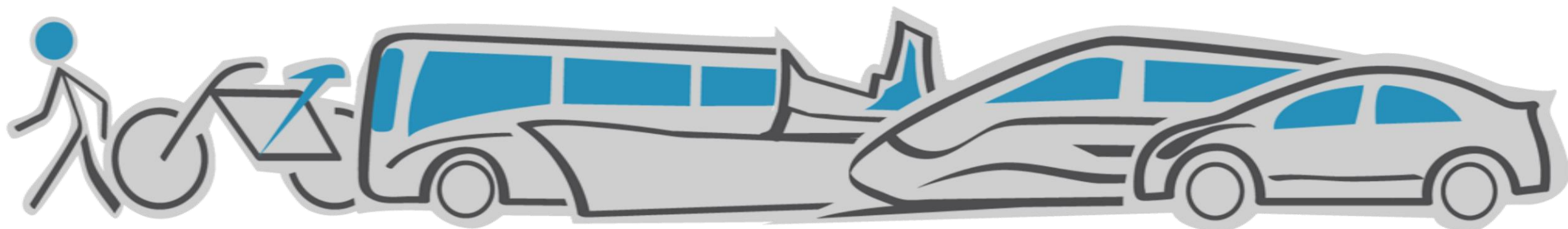


Transforming the Urban Space through TOD

City, Corridor and Station Scales

Gerald Ollivier

Transport Cluster Leader
World Bank Hub Singapore



WHY TOD?

More Competitive

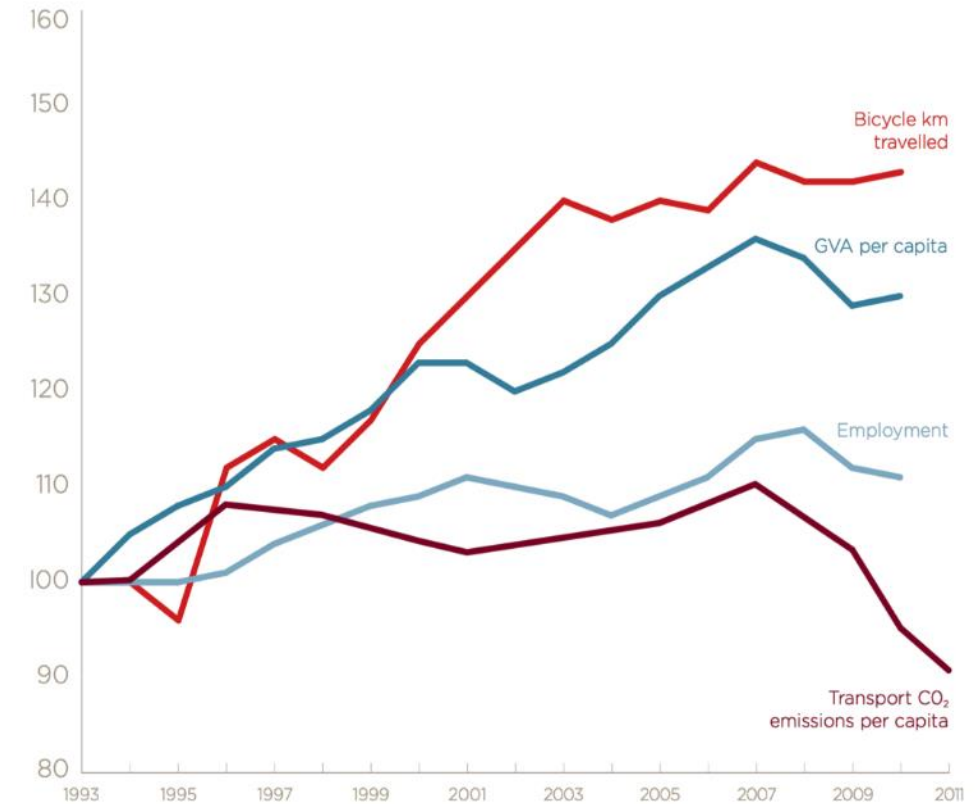
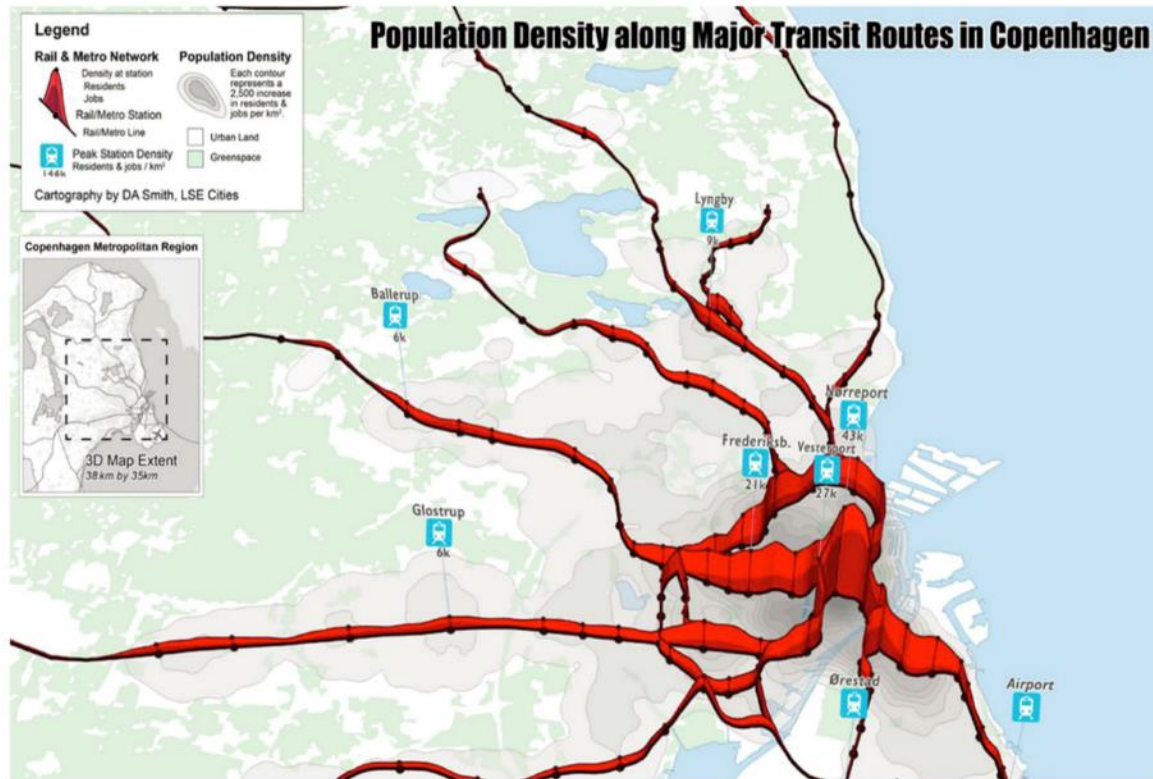
Access and Mobility
Lower Transport and
Housing cost

High quality
neighborhoods
with lower
infrastructure
costs and lower
CO2

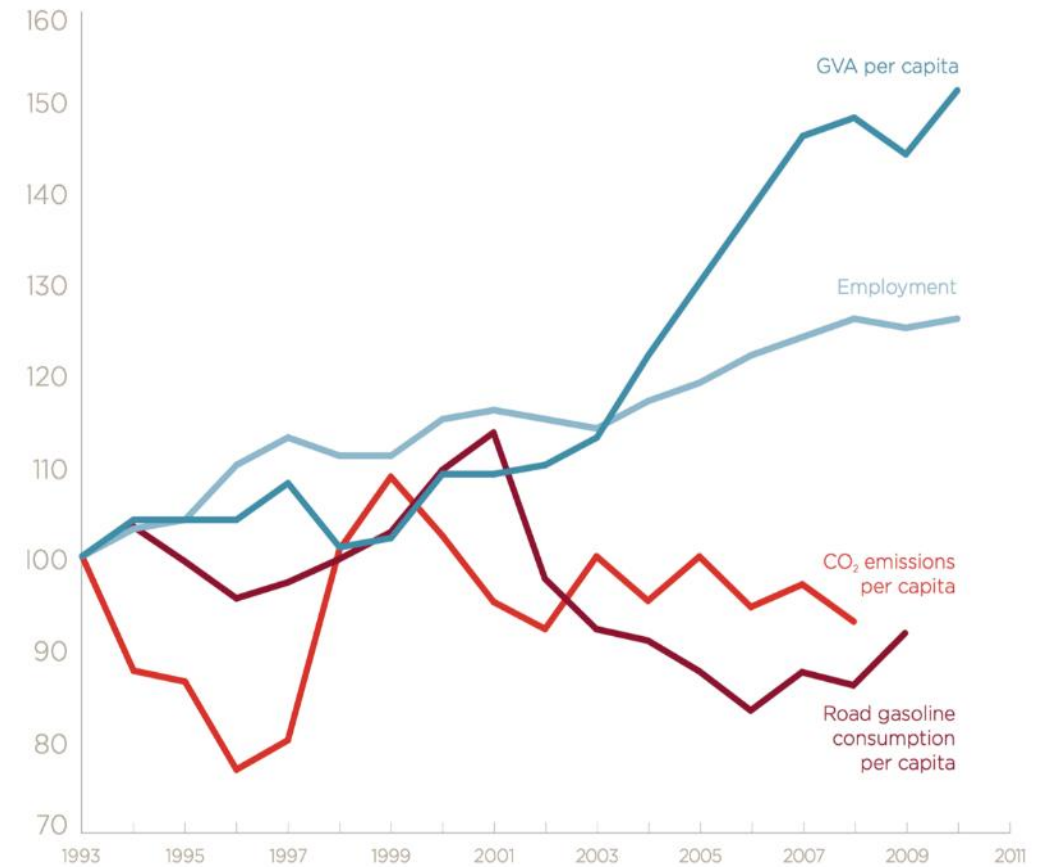
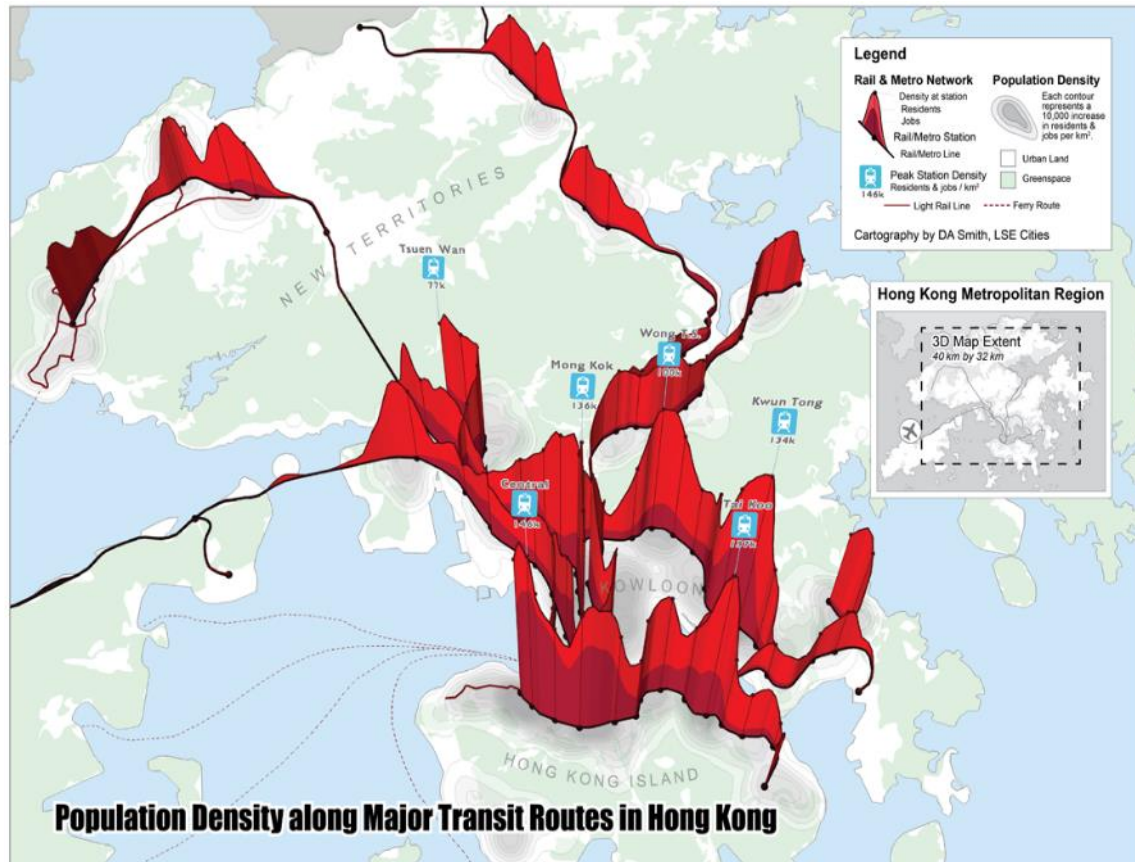
Resilient to
Natural
Hazards

Partly self
financing by
capturing
value
created

INTEGRATION OF LAND USE AND TRANSIT: GREEN GROWTH IN COPENHAGEN



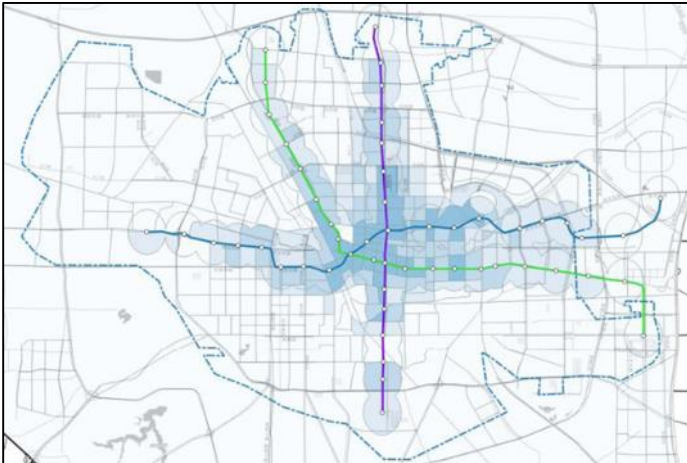
HONG KONG: DECOUPLING ECONOMIC GROWTH AND RESOURCE USE BY SHAPING A HIGH DENSITY URBAN FORM SUPPORTED BY TRANSIT



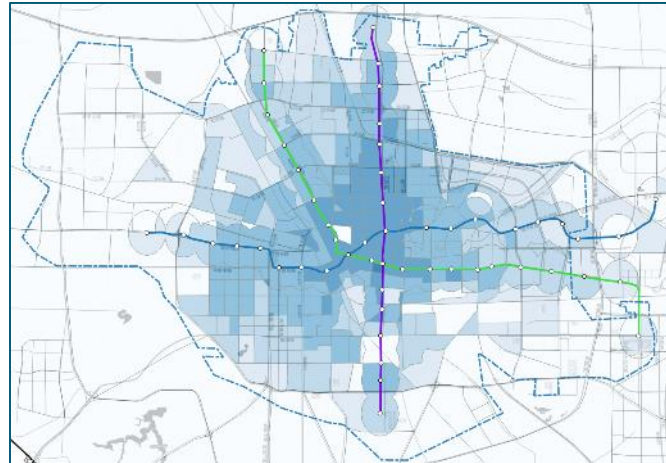
MEASURING JOB ACCESSIBILITY

$$\frac{\sum_{\text{location}} \left(\frac{\text{number of jobs accessible from each location}}{\text{total jobs in the city}} * \text{population in each location} \right)}{\text{Total Population}} \times 100\%$$

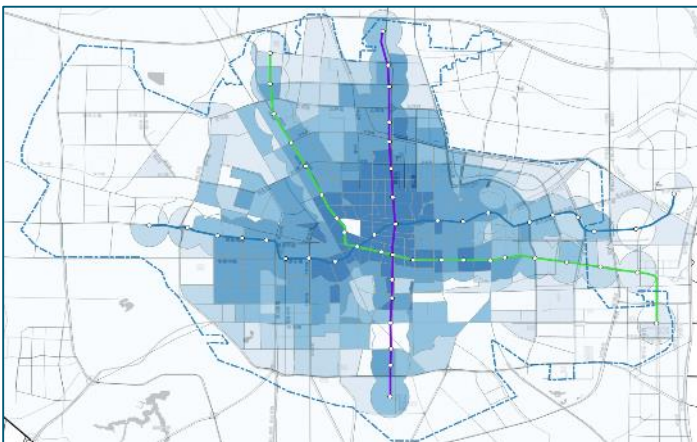
a. Line 1, 2, and 3 and walking: **12%**



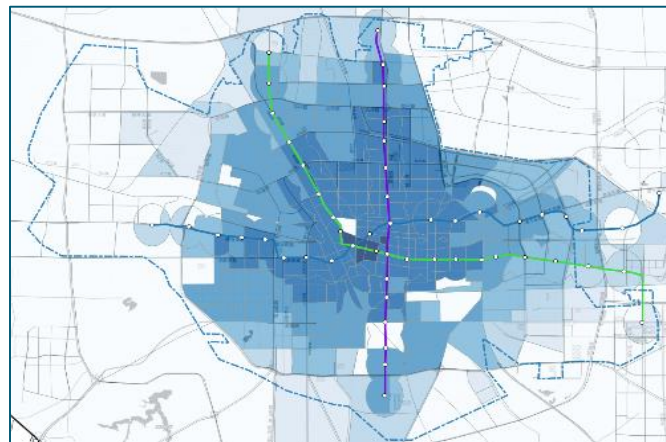
b. Scenario a plus bus: **28%**



c. Scenario b plus TOD: **39%**



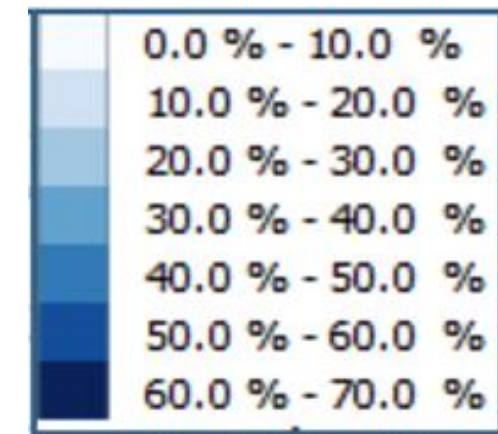
d. Scenario b plus bicycle: **46%**



Zhengzhou

- Population: 6.4 million
- GDP per capita: US\$11k
- Peak hour accessibility

Percent of jobs accessible within 45 minutes by public transit

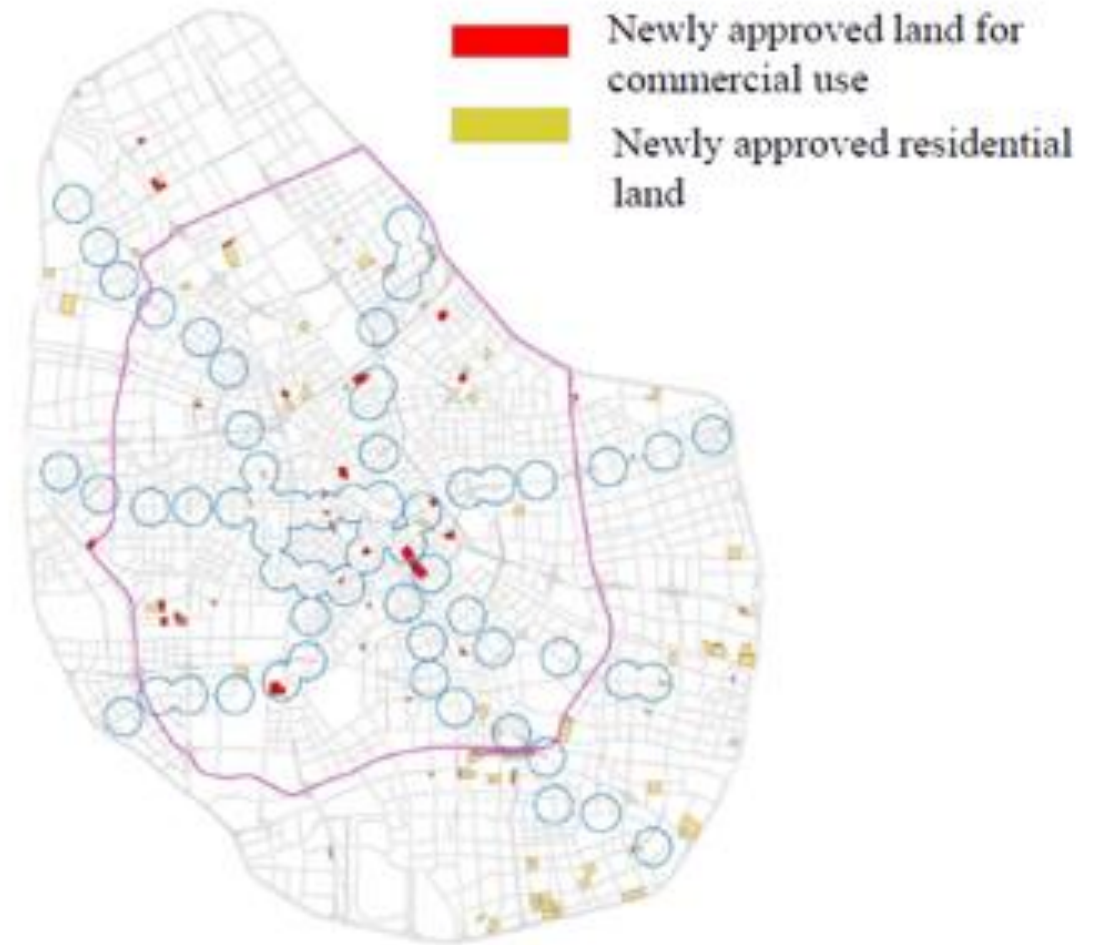


LAND DEVELOPMENT AND ACCESSIBILITY

Only 15% of new development in the access range of metro stations in 2015

Scope	Scale of construction plots within the coverage (hectares)	Scale of construction plots outside the coverage (hectares)
Residential	2.61	148.87
Public infrastructure	25.29	4.37
Total	27.9	153.2

Guaranteed future congestion



Rail traffic lines relation graph of approved construction plots and status-quo in 2015

8 PRINCIPLES

FOR INCLUSIVE AND RESILIENT TOD

1	Align Human/Economic Densities, Mass Transit Capacity and Network Characteristics for Greater Accessibility
2	Create Compact Regions with Short Commutes
3	Ensure Resilience of Areas Connected by Mass Transit
4	Plan and Zone for Mixed Use and Mixed Income Neighborhoods at Corridor Level
5	Create Vibrant, People-Centric Public Spaces Around Stations
6	Develop Neighborhoods that Promote Walking and Biking
7	Develop Good Quality, Accessible and Integrated Public Transit
8	Manage Private Vehicle Demand

Source: World Bank TOD COP

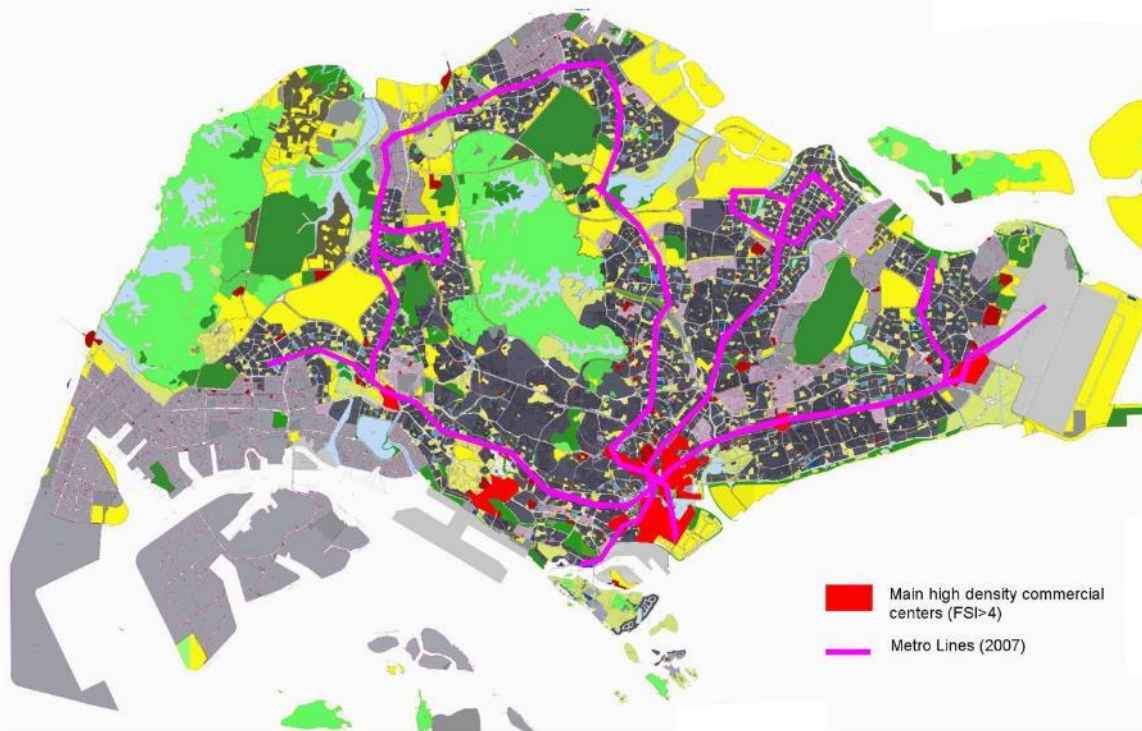


TOD at City Scale

Transit accessibility in 2015
from Auber-Opéra

SETTING A VISION WITH CLEAR TARGETS

By 2030 in
Singapore



Source: Alain Bertaud

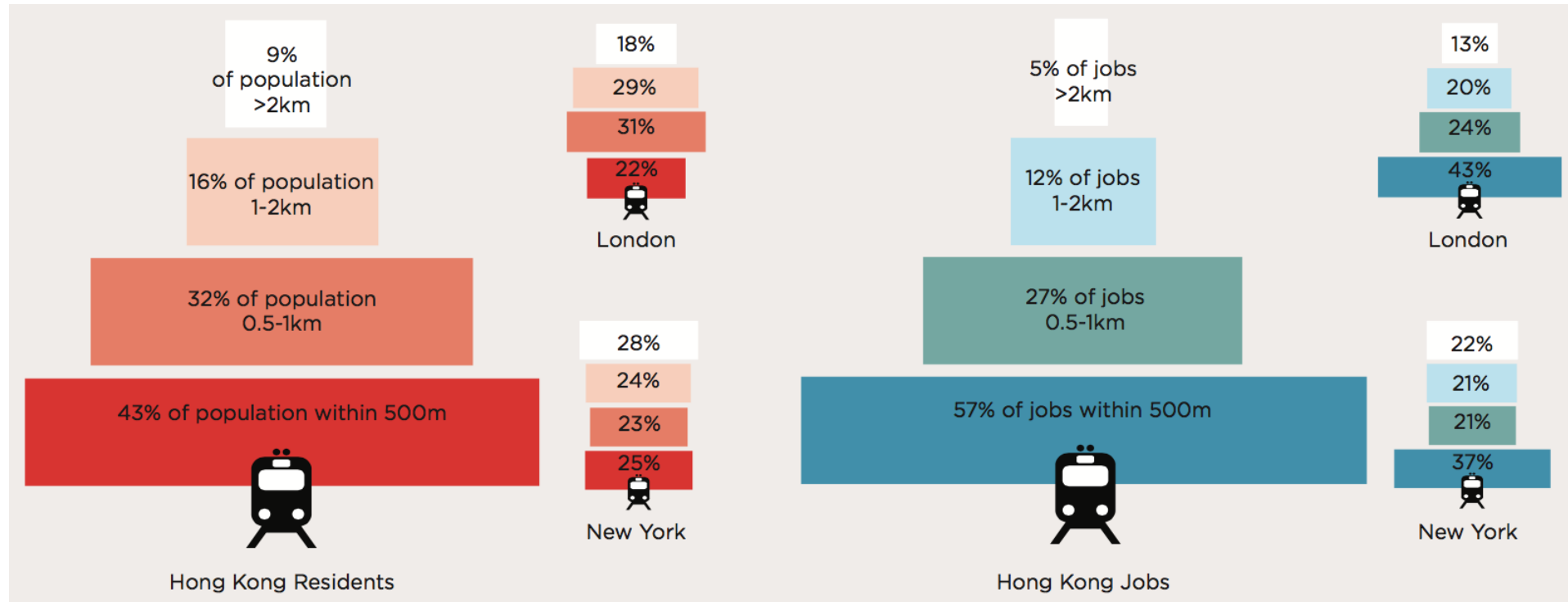
8 in 10
households
living within a 10
minute walk
from a train
station

85%
of public
transport
journeys (less
than 20 km)
completed within
60 minutes

75%
of all journeys in
peak hours
undertaken on
public transport

*Land Transport
Master Plan
2013*

ACCESSIBILITY TO TRANSIT OUTCOMES OF ALIGNING HUMAN AND ECONOMIC DENSITIES WITH TRANSIT LINES



Pedestrian accessibility to rail and metro stations

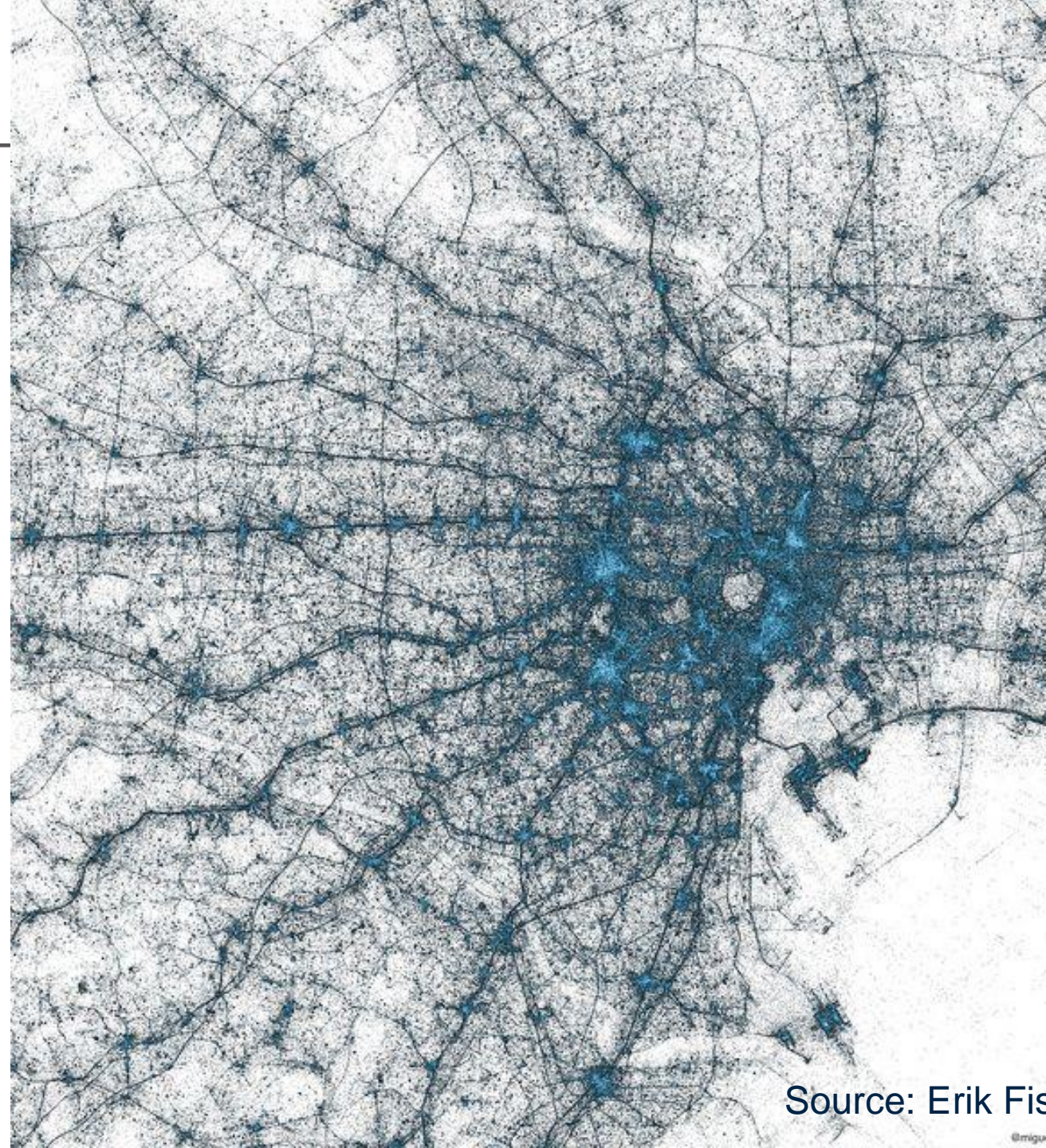
NY & London: More than half people and more than 2/3 jobs located less than 1 km to mass transit stations

HK: 3/4 of people and 83 % of jobs located less than 1 km to mass transit stations

Source: LSE Cities

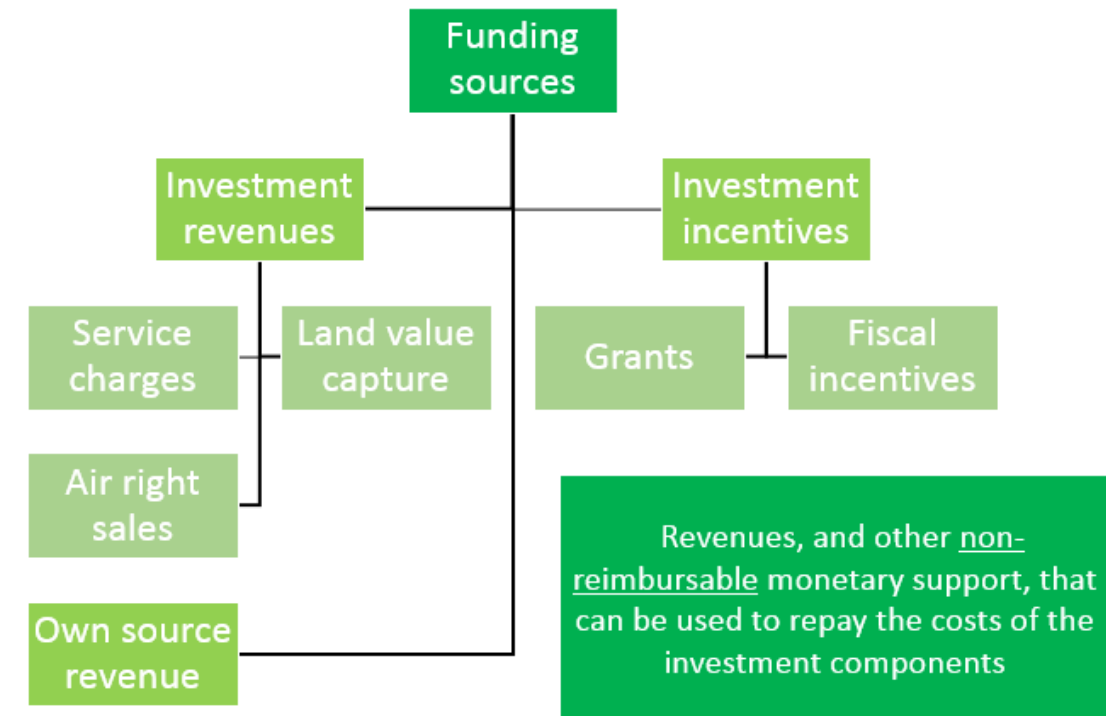
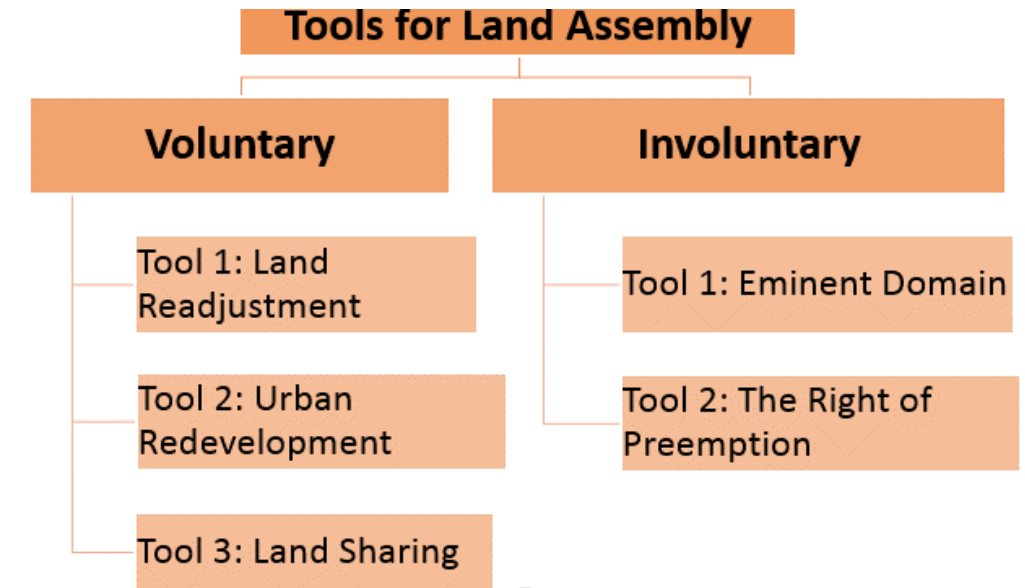
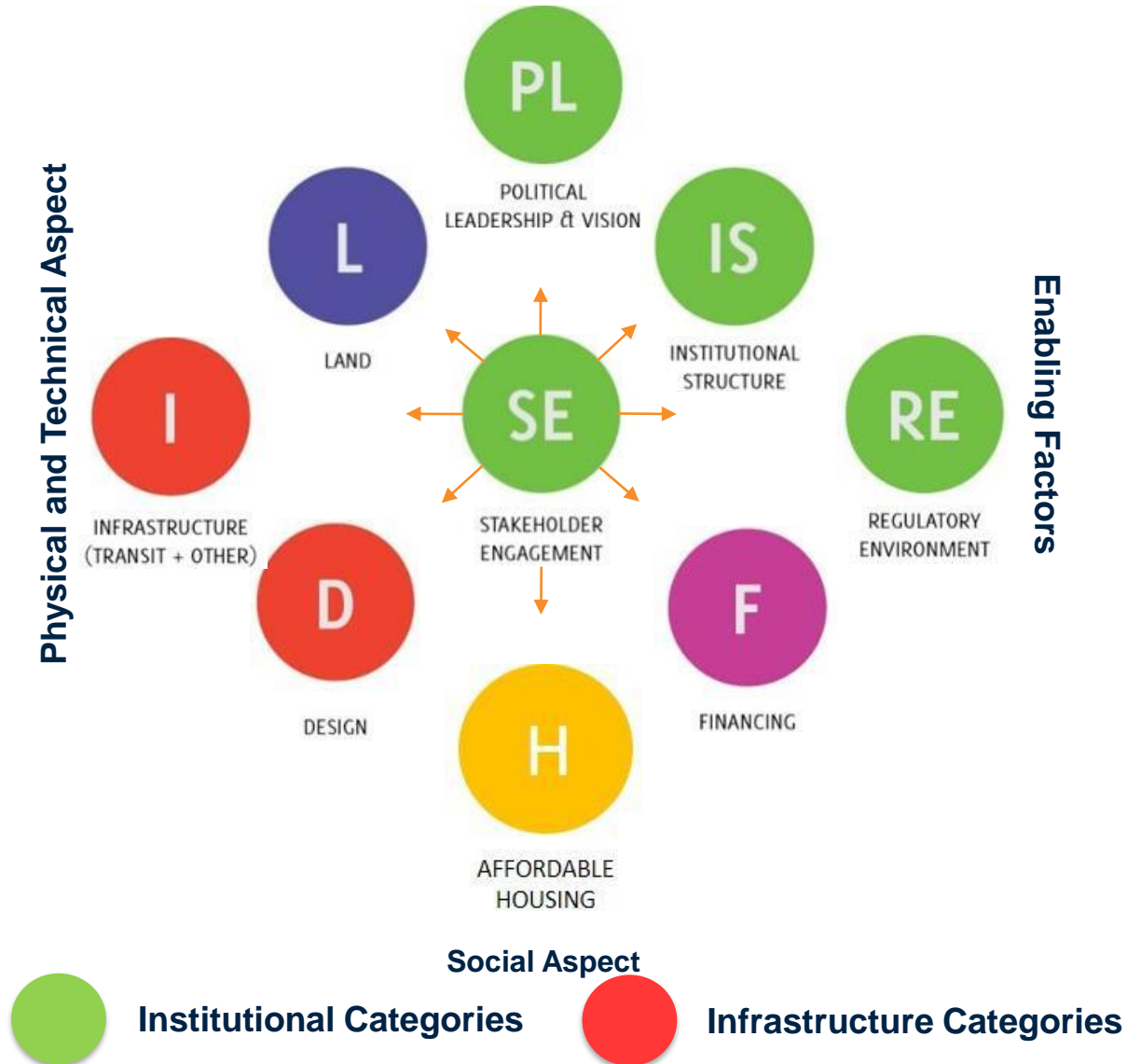
REFLECT URBAN VARIATIONS

- Articulating urban densities
- Creating a hierarchical public transport network (mass transit) supported by good walkability and bikability
- Ensuring affordable housing near mass transit city wide



Source: Erik Fis
















TOD TOOLS



DESIGN ELEMENTS OF TOD AT VARIOUS SCALES

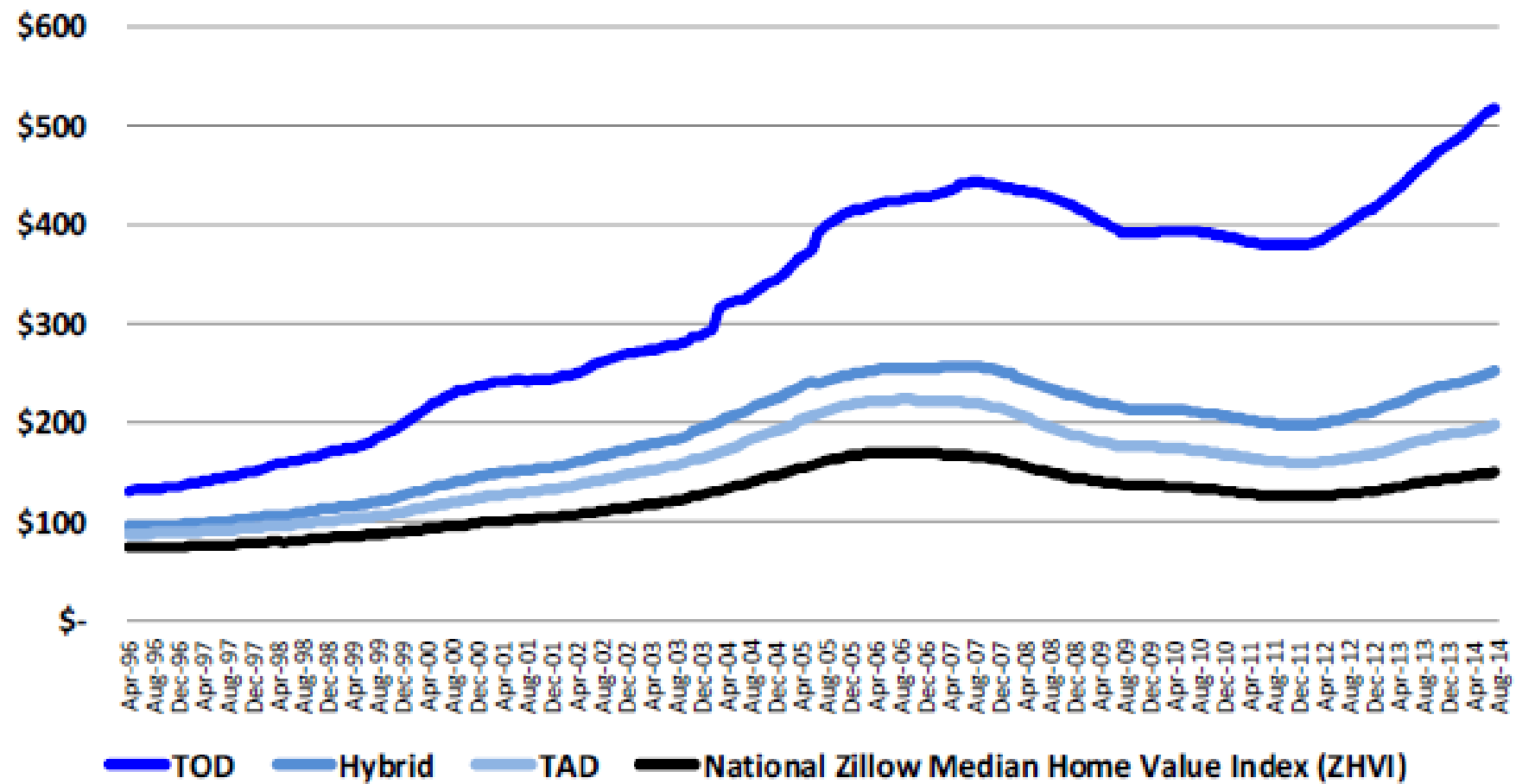
COMPONENTS \ SCALES	CITY	INTER-NEIGHBORHOOD	NEIGHBORHOOD	STREET
 QUALITY PUBLIC TRANSIT	 <p>Proximity to urban centers</p>	 <p>Financial viability of public transit</p>	 <p>Access to public transit</p>	 <p>Public transit infrastructure</p>
 NON-MOTORIZED MOBILITY	 <p>Continuous street network</p>	 <p>Pedestrian and cycling networks</p>	 <p>Internal connectivity</p>	 <p>Sidewalks and bike paths</p>
 VEHICLE DEMAND MANAGEMENT	 <p>Optimization of daily commutes</p>	 <p>Safe and orderly roads</p>	 <p>Parking management</p>	 <p>Road safety for all users</p>
 MIXED-USE AND EFFICIENT BUILDINGS	 <p>Regional facilities</p>	 <p>Public amenities and marketplaces</p>	 <p>Efficient buildings</p>	 <p>Live streets</p>

DESIGN ELEMENTS OF TOD AT VARIOUS SCALES

SCALES COMPONENTS	CITY	INTER-NEIGHBORHOOD	NEIGHBORHOOD	STREET
 NEIGHBORHOOD CENTERS AND ACTIVE GROUND FLOORS	 <p>Local economy</p>	 <p>Neighborhood centers</p>	 <p>Active ground floors</p>	 <p>Public-private transition</p>
 PUBLIC SPACES AND NATURAL RESOURCES	 <p>Green area networks</p>	 <p>Energy, water and waste efficiency</p>	 <p>Green and public space networks</p>	 <p>Public life</p>
 COMMUNITY INVOLVEMENT AND IDENTITY	 <p>Inclusive stakeholder engagement</p>	 <p>Place identity</p>	 <p>Community management</p>	 <p>Sharing the street</p>

Home Values

\$ per s.f.

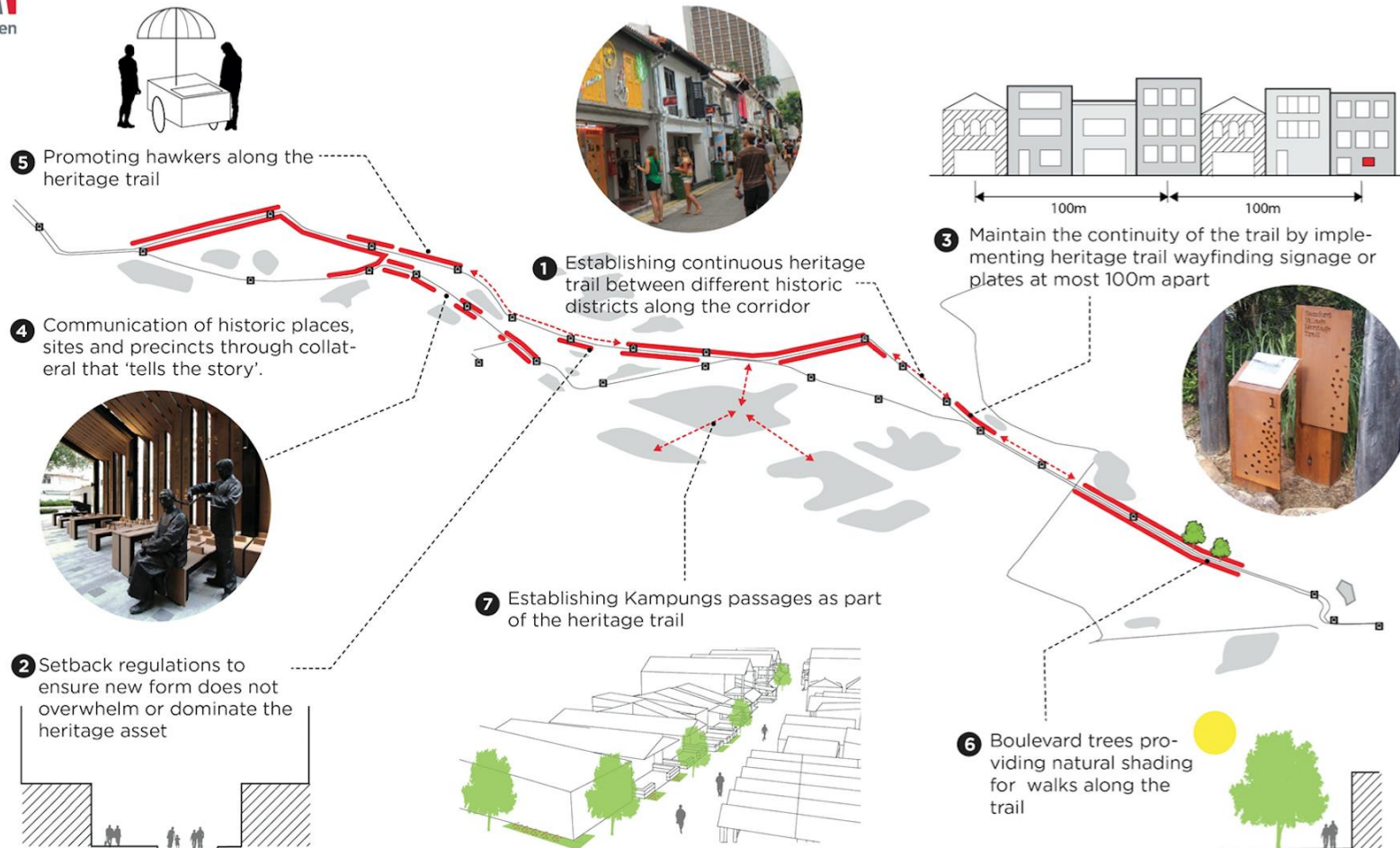


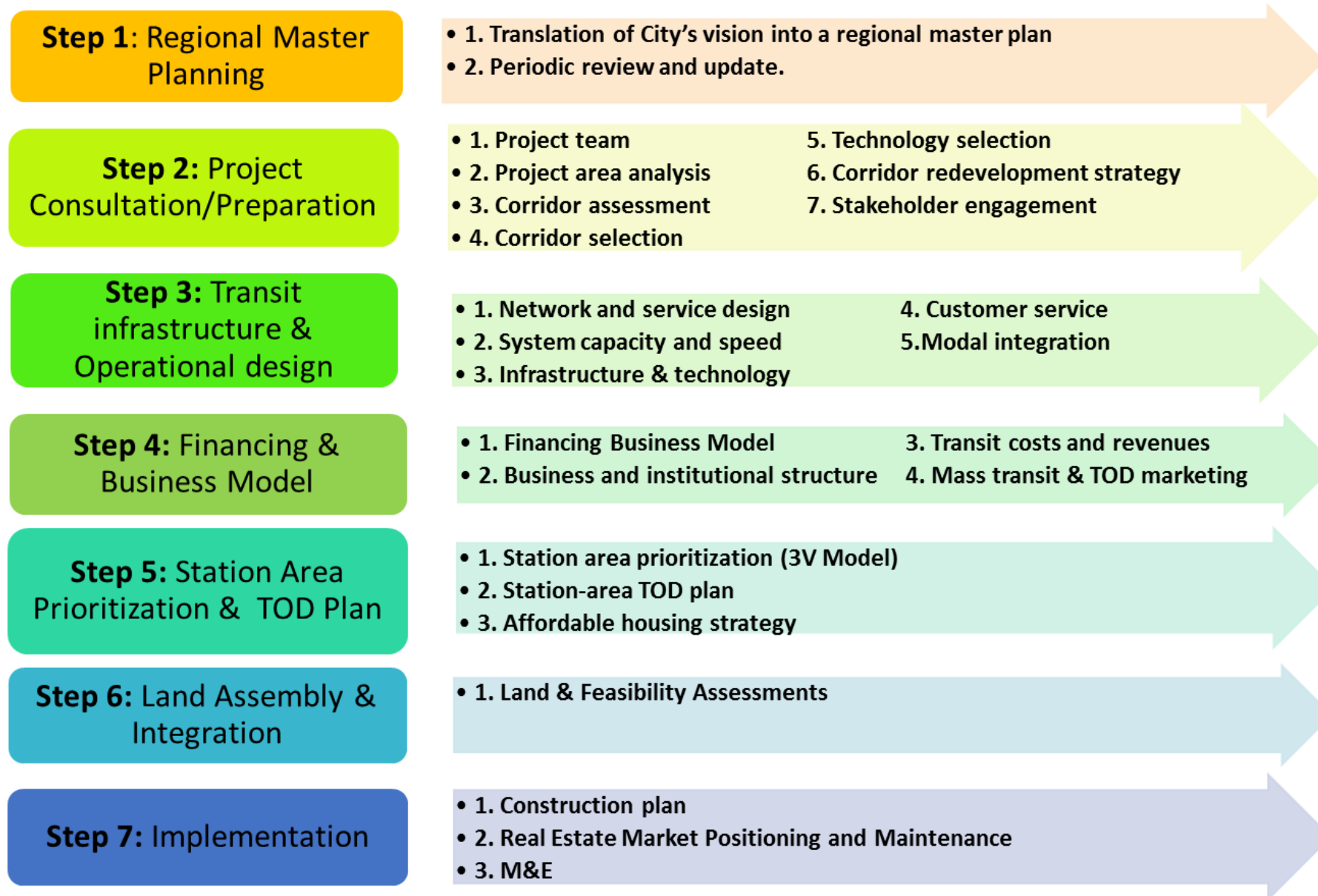
TOD at Corridor Scale

TASTE OF TOD: A PLAN FOR SURABAYA, INDONESIA

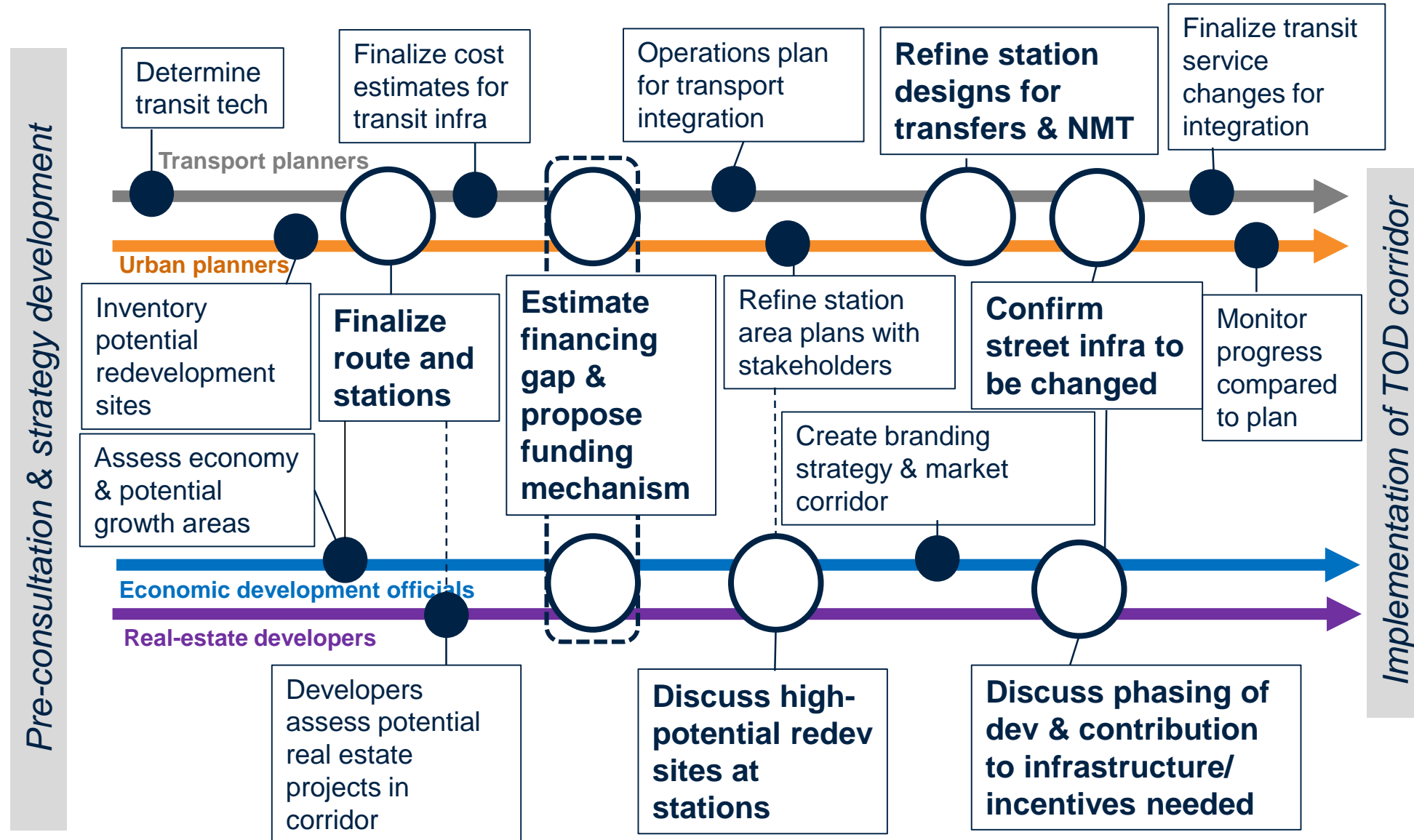


City Form Lab





TOD Corridor Planning & Implementation



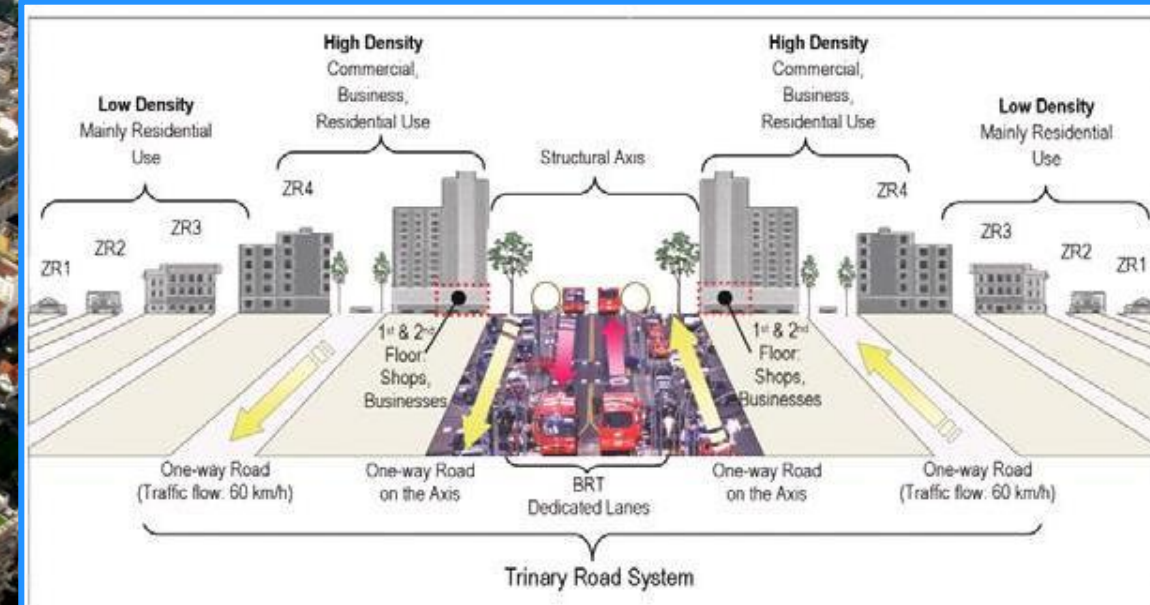
CURITIBA: FOCUSED DEVELOPMENT AROUND BRT CORRIDORS



**BRT corridor supports
higher density
development**

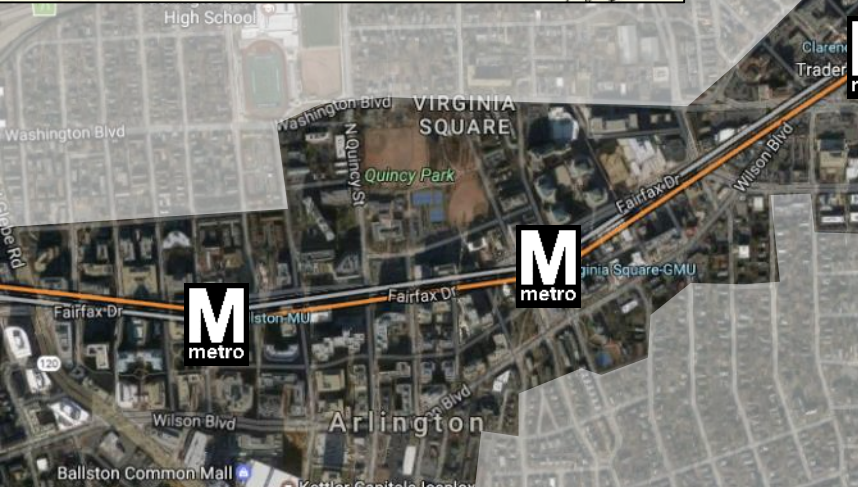
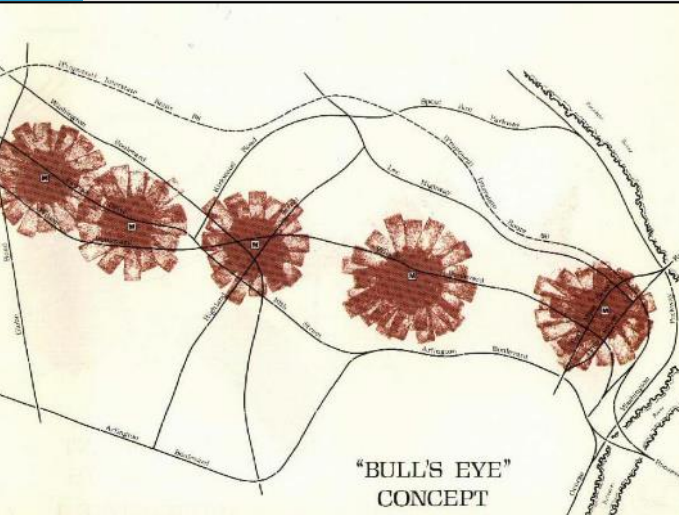
Curitiba has focused its urban growth around their RIT express network of BRT corridors

CEPAC (tradable air rights) permits for high-density development partially funded construction of new Linha Verde (Green Line)



Above: Diagram by Lindau et al. (2010)
Left: Curitiba Centro, Image by Francisco Anzola

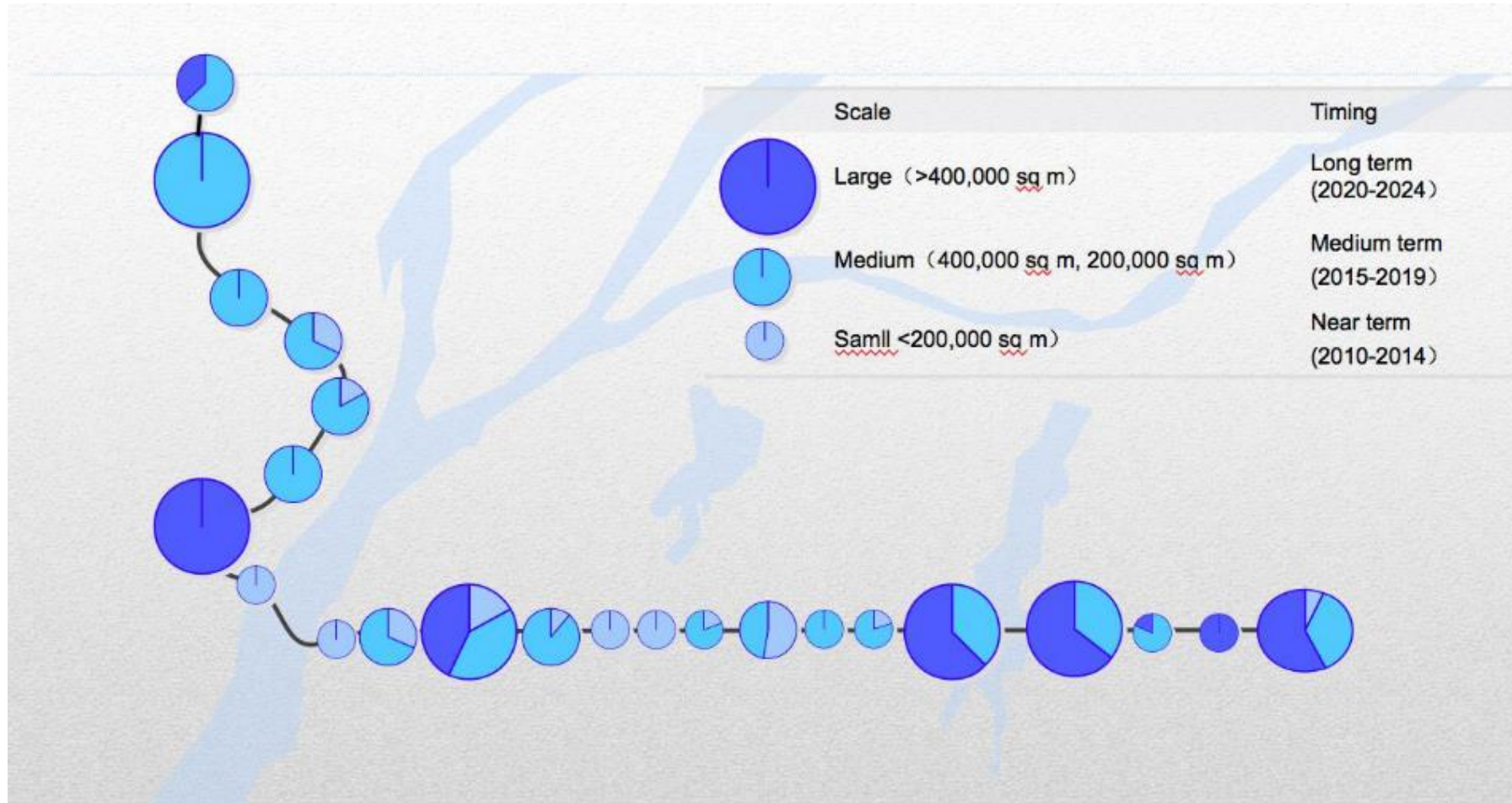
ARLINGTON: BALLSTON-ROSSLYN DENSIFICATION & URBAN DESIGN



Consistent long-term planning in Arlington, USA (next to Washington, DC) has turned an auto-oriented corridor into a set of urban transit-oriented neighborhoods

Satellite imagery above from Google Maps
"Bull's Eye" Concept from Arlington County Planning

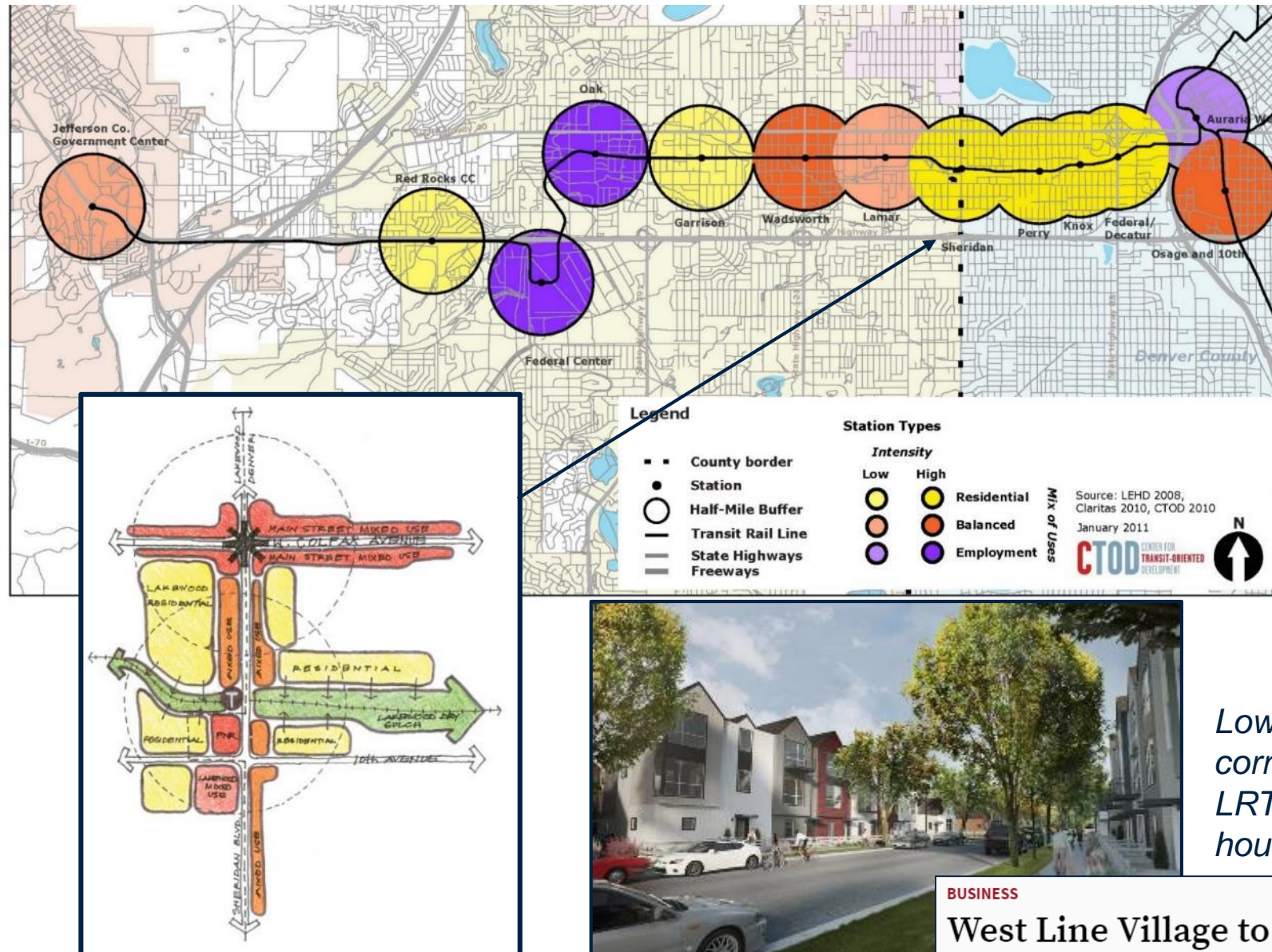
NANCHANG: SCALE AND SEQUENCE OF TOD



Metro Group adopted phased strategy for TOD along Line #1, starting from stations in downtown and move on to the suburbs.

As of 2016, estimated profits from TOD will cover 15-20% of the total construction costs of Line #1 and #2.

DENVER: WEST LRT CORRIDOR – RANGE OF TYPOLOGIES



RTD West light rail corridor in Metropolitan Denver (USA) opened in 2013

Planners recognized widely varied existing land use contexts, and developed typologies for residential, employment, and balanced TOD nodes

Lower property values along this corridor (compared to other Denver LRT corridors) allow more affordable housing to be prioritized



BUSINESS

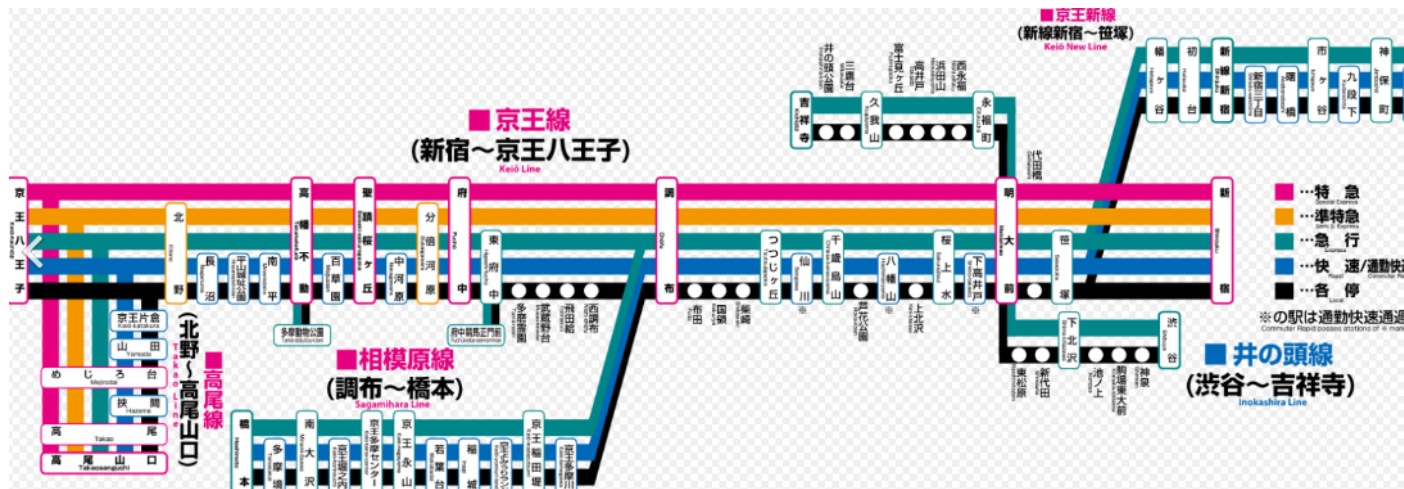
West Line Village to offer “attainable” for-sale housing near Sheridan light rail station

TOKYO: LINEAR GROWTH WITH SELF-FINANCED RAIL



Private railway companies in Tokyo (e.g. Keio, Tokyu, Odakyu, etc.) are often real estate developers, creating synergies between their rail operations and real estate

These companies focus on building housing and commercial space near their lines to generate demand, and many TOD neighborhoods have high-quality urban design (see Jiyugaoka above left)





TOD at Station Scale

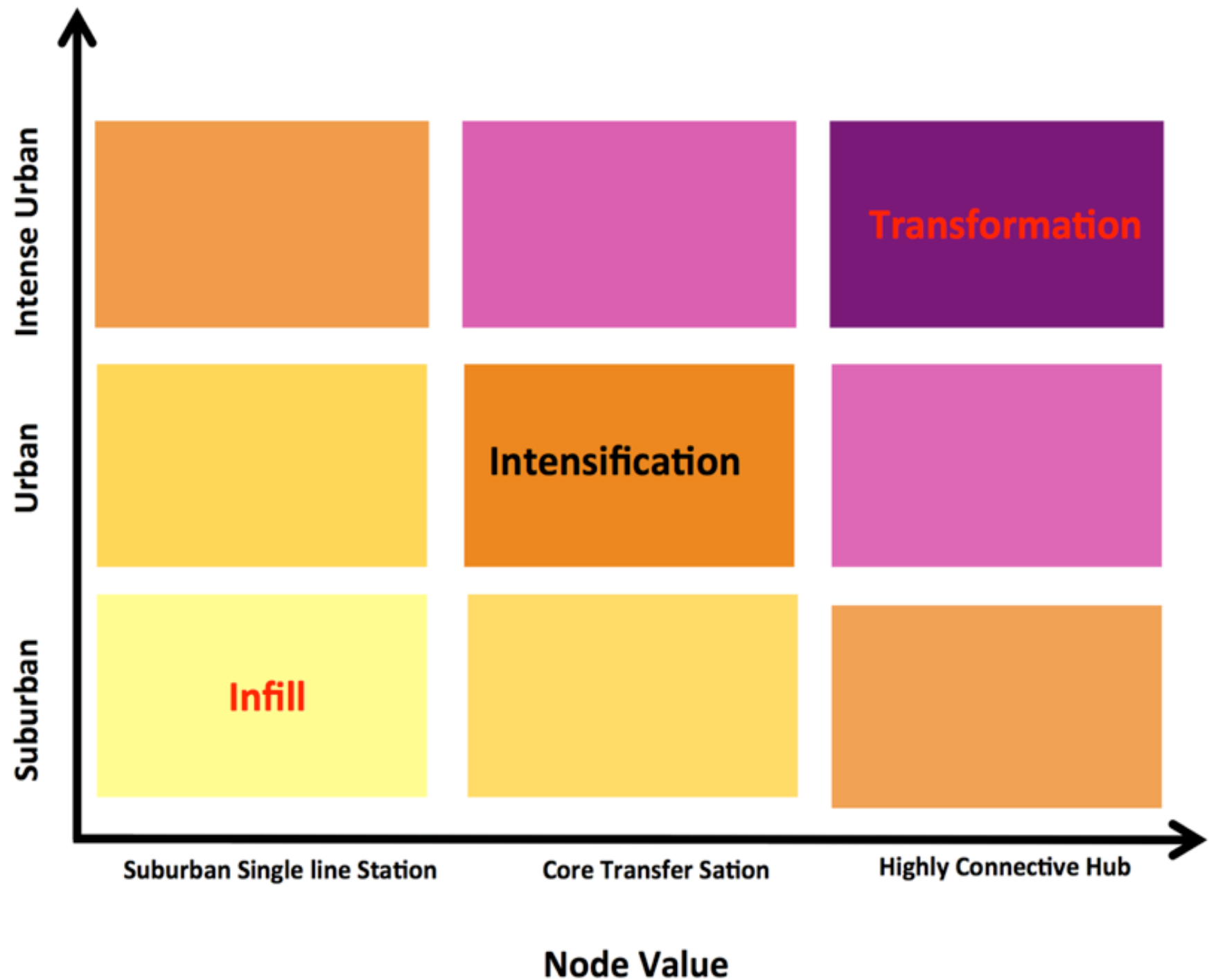
Source: F. Labbe



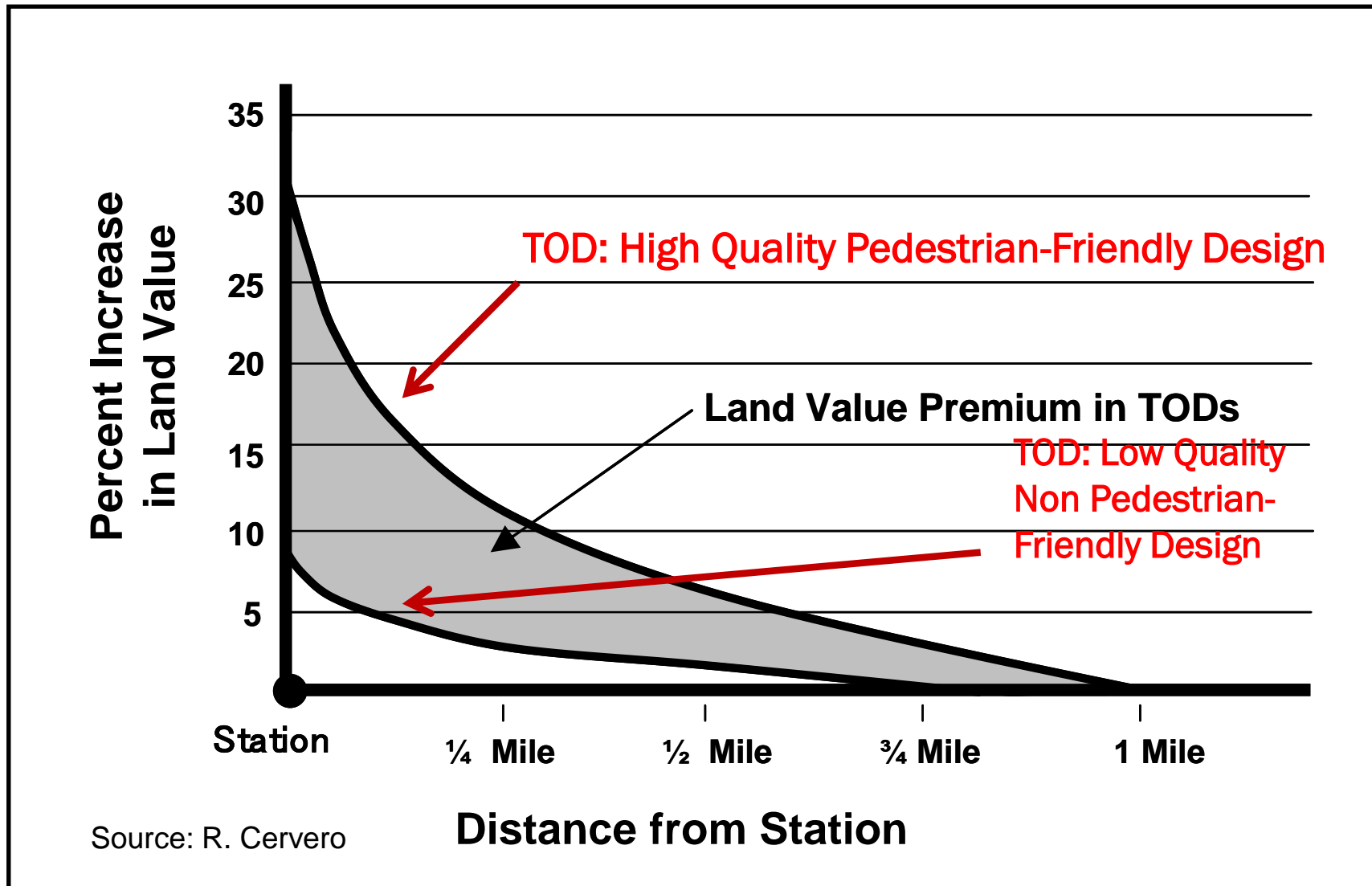
Source: Hudson Yards website

Understanding Station Position in Urban Landscape

Applying the 3V Approach



IMPACT ON VALUE



Spirit of place



Enclosure



Human Scale



Layering of Space



Complexity



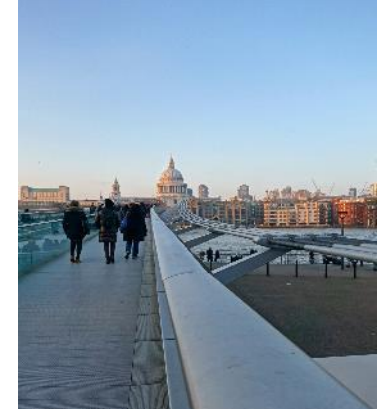
Coherence



Legibility

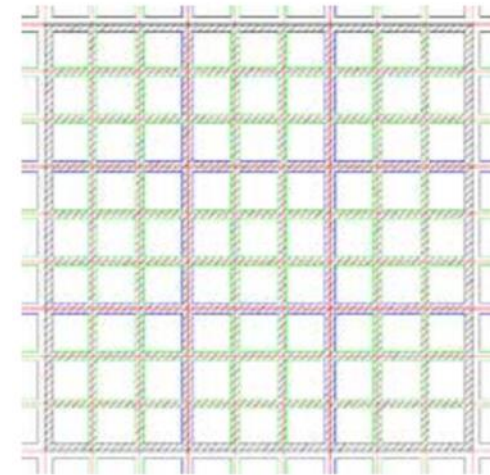


Linkage

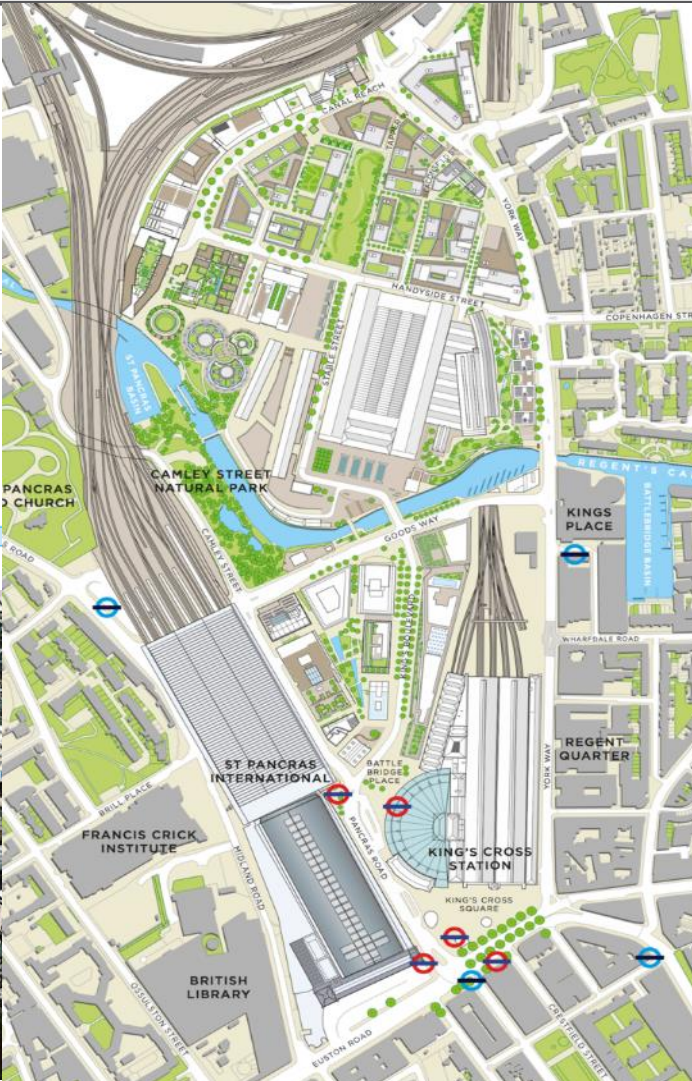
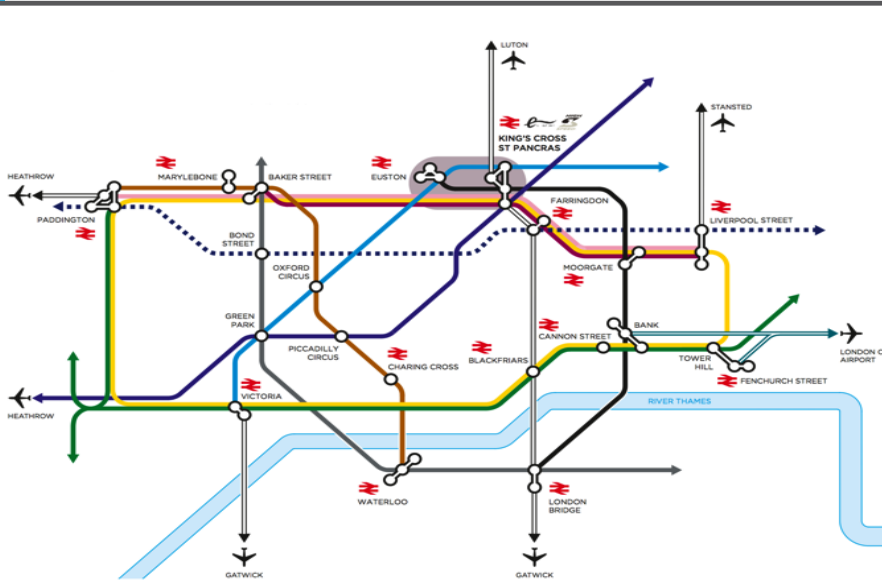


STRATEGY FOR SUSTAINABLE NEIGHBORHOODS

- Local accessibility based on small blocks and on dense and connected street patterns with at least between 80 to 100 street intersections/km².
- Adequate space for streets. Street network occupies at least 30 per cent of the land and with at least 18 km of street length per km².
- High quality public space.
- Good quality pedestrian connections (sidewalks, street crossings).
- Traffic calming, traffic and parking management.
- Density levels over 800-meter area within walking distance of station depend on magnitude of transit investment.
- Densities of at least 15,000 per km² for sustainable neighborhoods.



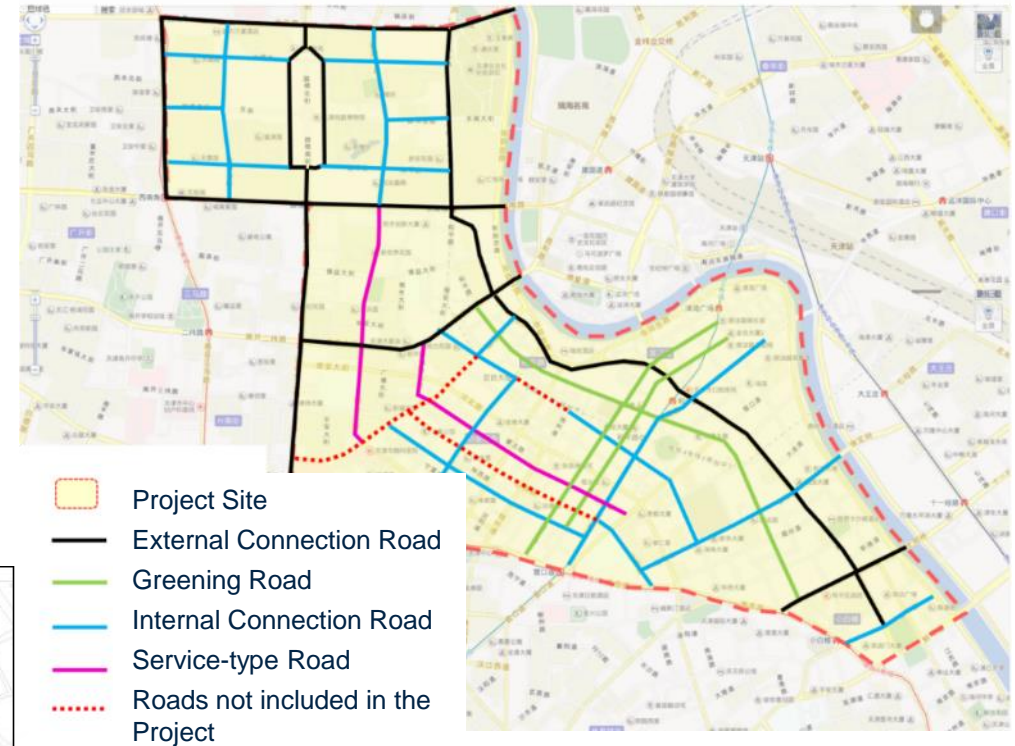
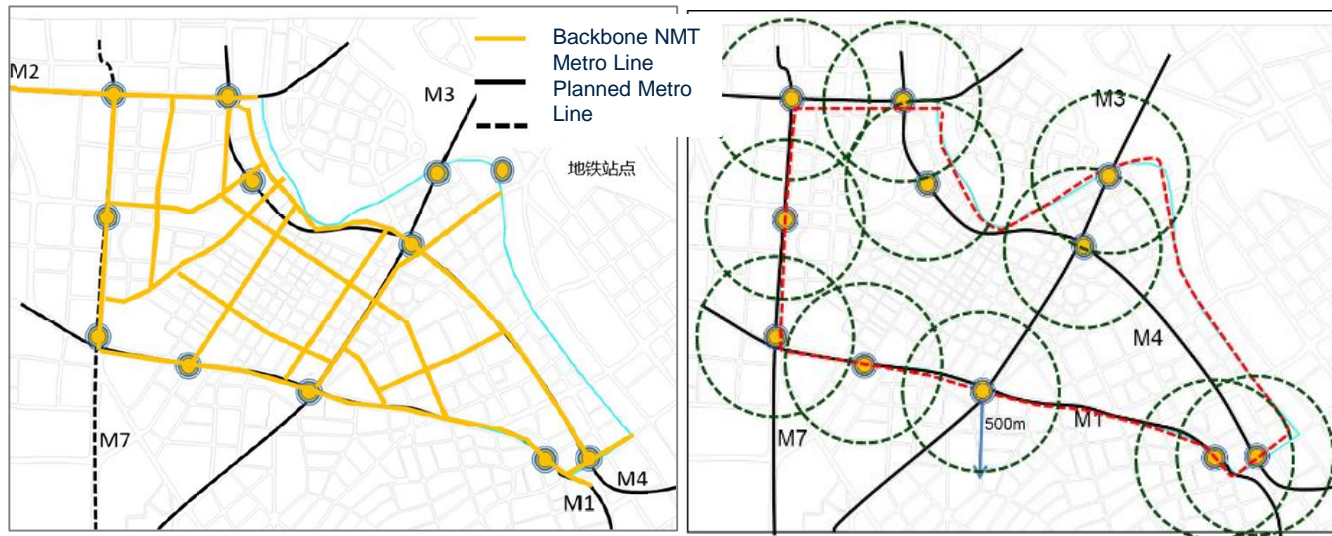
CREATING A SAFE NETWORK FOR PEDESTRIAN KING'S CROSS

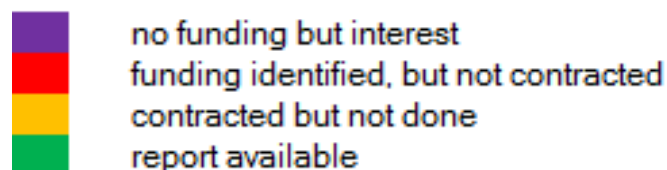


IMPROVING LOCAL ACCESSIBILITY -TIANJIN

Component 1: Green Transportation Improvement in Heping & Nankai Districts

This Component will finance the redevelopment of the streetscape in certain parts of Heping and Nankai Districts, including the creation of an integrated pedestrian and bike network with infrastructure investments in, *inter alia*, street pavement updates, drainage improvements, street facilities, and landscape improvements.





City Scale

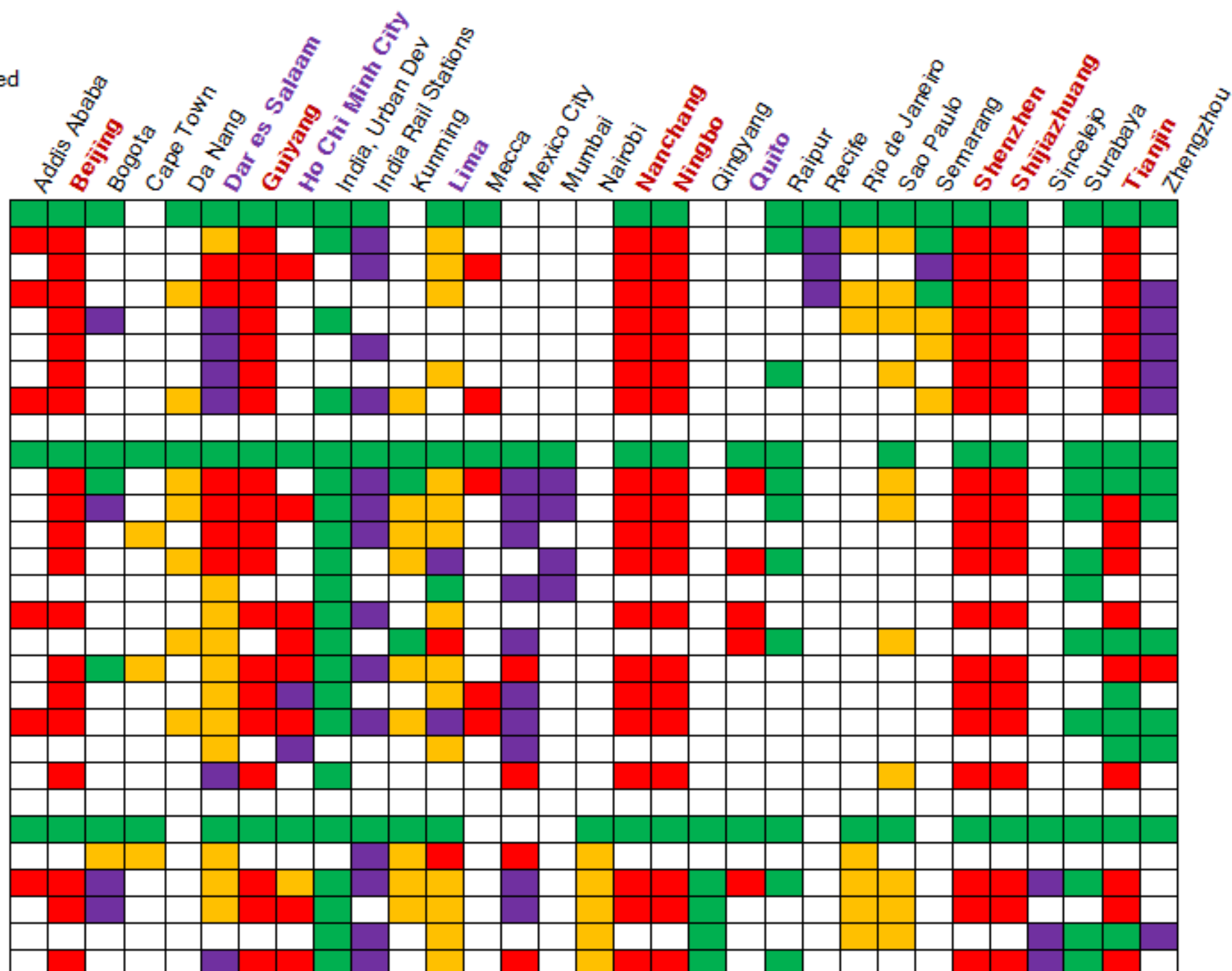
Land Use Policy and Strategy
 Legal and Regulatory Framework
 Integrated Land Use and Transport
 Modeling of TOD
 Leveraging Private Sector
 Improving Accessibility around Stations
 Capacity Building

Corridor Scale

Understanding Transformation Potential
 Integrated urban/transport development
 Legal and Regulatory Framework
 Design and Planning Guidelines
 Feasibility Study
 Operational guide
 Accessibility Plan and Integrated Transport
 Financing Scheme/LVC
 Citizen Engagement
 Capacity Building
 Evaluation
 Social housing

Station Scale

Feasibility Study for PPP and TOD/structuring
 Conceptual Design
 Accessibility planning
 Case Studies
 Public space at local scale





Welcome to Tokyo