

veritas | eecture  
SERIES #13

AUDREY TEO LOH  
8<sup>th</sup> AUGUST 2019



**FORWARD**  
MOVING PENANG  
INTO THE FUTURE

**Value capture for Transit Infrastructure Development**

# VALUE CAPTURE

Investments in Transit Infrastructure improves the built environment, create opportunities and foster development along the service corridors, at the nodes, and where land are reclaimed to facilitate the Transit project.

Capturing the value of this benefit through various tools is gaining interest as a finance mechanism for infrastructure investments.

**Where is “Value created” ?**

**Capture by Whom? And How?**

The Mechanisms to capture value, as shown in other parts of the world will be discussed. Could these measures be suitable for Penang?

*Not (re) inventing the wheel!  
It is in virtually all countries  
Some existing legal proviso*

*value capture makes good  
sense!  
Some value captured in all  
countries even if  
unintentionally or implicitly!*

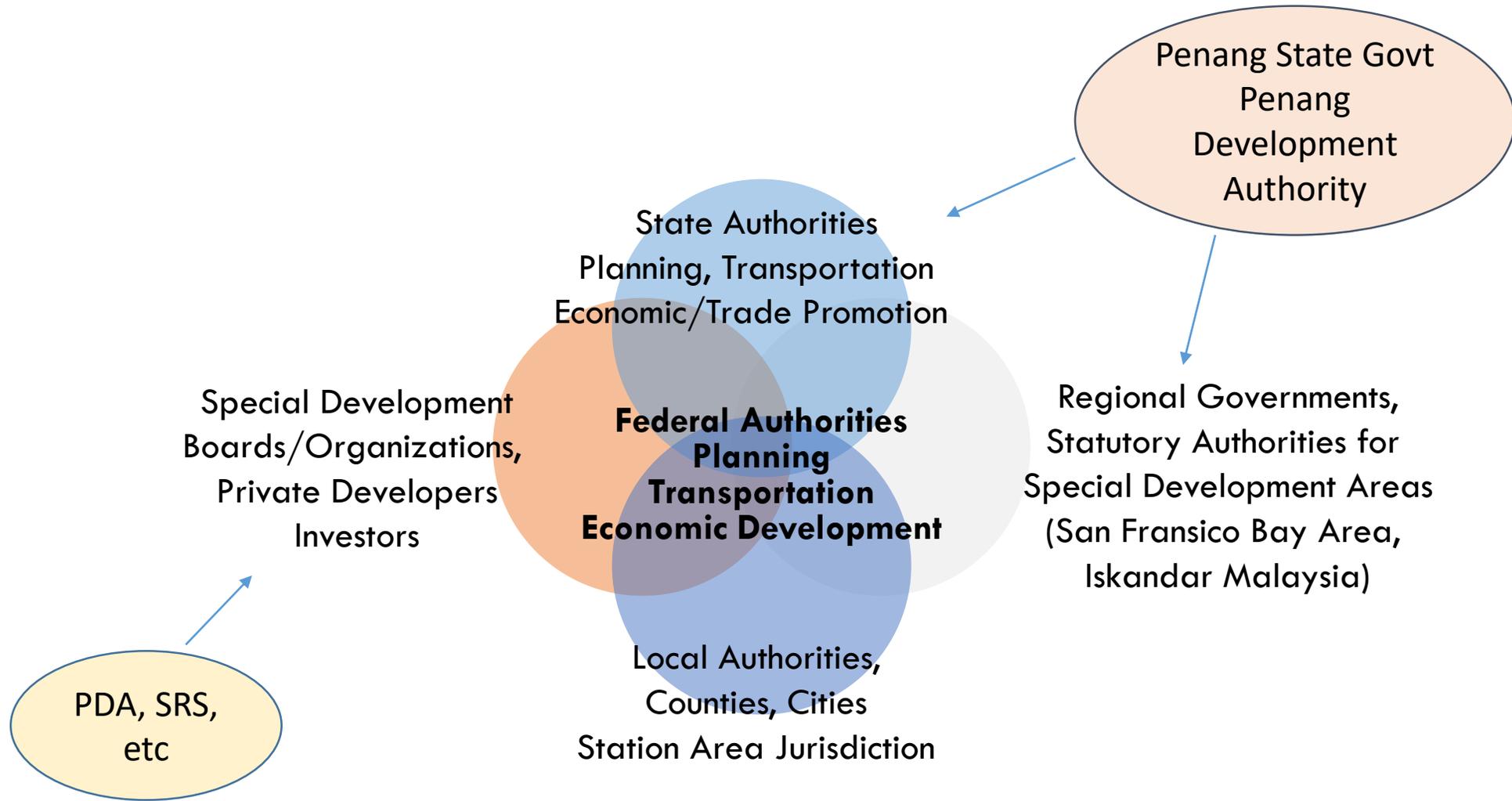
*...Says Martin Smolka  
Lincoln Institute of Land Policy  
UN HABITAT*

# Agenda

1. Transit Development Stakeholders and Constituency
2. Economic Modeling and Value Capture
3. Overview of Different Mechanism
4. Models of intergovernmental and private sector VC coordination
5. Value Capture with Urban Quality
6. Key Takeaways

# Transit Development Stakeholders and Constituency

## Legal and Economic Framework



# Economic Modeling and Value Capture

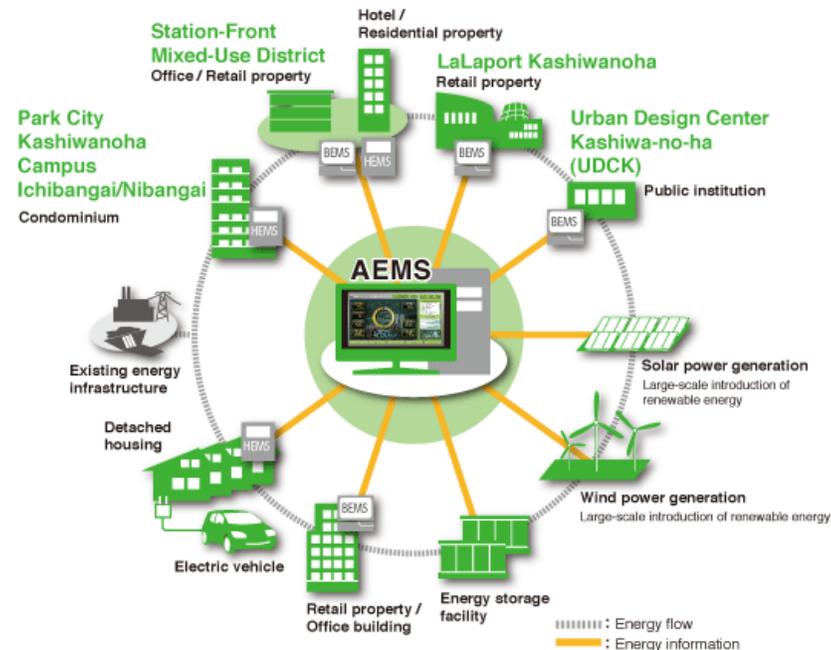
## Political, Social and Economic goals

- **VISION**
- **Masterplan for Long term Growth**
- **Monitor and Research Trends & Distribution**
- **Short term Goals and Implementation Strategy**
  
- **\*RESISTANCE in the 4 I's** (\*M. Smolka, UN Habitat)
  - Ideology
  - Interest
  - Ignorance
  - Inertia

**“Kashiwanoha Smart City” to serve as global models for resolving issues**



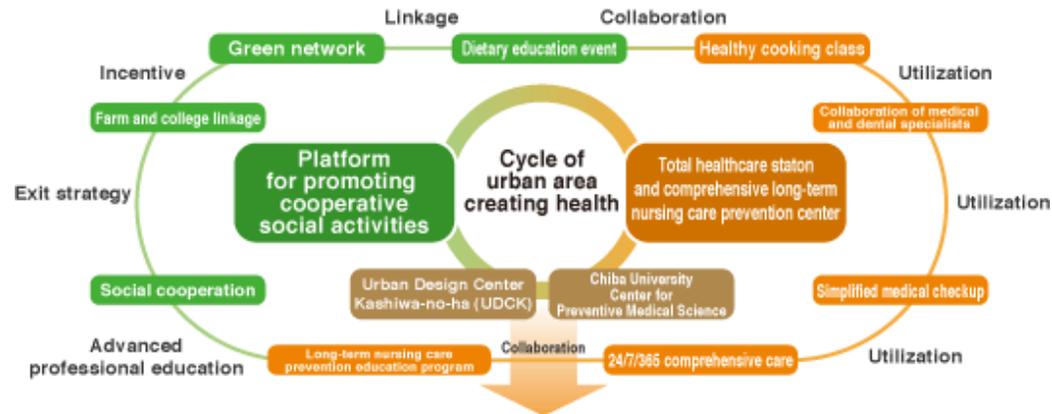
**Safe, secure and sustainable smart city**



**Mitsui-Fodusan Group Long Term Vision 2025**



**Ecosystem for innovation along the Tsukuba Express**  
 Building a locally-based sustainable support system for business startup primarily for entrepreneurs and startup companies



Realizing the respective lifestyles of children who will open up the future, the vigorous working generation, active energetic senior citizens and the elderly living in a way that allows them to be themselves

Aiming to foster accumulation of research and corporate participation in health fields, enrichment of childcare support environment and climate for multi-generational interaction

# Economic Modeling and Value Capture

- Future proofing evolving cities to mitigate growing concerns of traffic congestion
- Anticipating the growth of the population and planning in accordance to public mobility demands
- Looking at land asset management and future development of land in conjunction with the growth of the city
- Pre-empting and allocating resources according to plans in place for the future
- Managing changing urban density in view of urban sprawl development

**DENSITY**

**DISTANCE**

**DEMAND**

**DIVERSITY**

**DESIGN**

**DESTINATIONS**



Density impact

Washington DC Metro

# Project Essentials for Transit Projects

1. Financing: Capital Cost & Cashflow
2. Planning & Design: Location of Stations, Linkages
3. Externalities: Technical Constraints, Construction Impact, Sequential Development
4. Sustainability: Operations, Market Demand, TOD

# VALUE CAPTURE TOOLS

## DIRECT

Land Sale (Sales of Transit Sites)  
Betterment Contribution  
Land Readjustment  
Land Leasing of Public land  
Land Value Tax – incl Progressive  
Land Value Increment Tax  
Development Charge and fees  
Charges to Building rights  
Urban Operations  
Certification of Additional Potential CePAC  
Construction Bonds

## INDIRECT

Property Tax  
Special Districts – BIDS  
Expropriations  
Exactions  
Tax Increment Financing – TIF  
Linkage Operations  
Transfer of Development Rights (TDR)  
Land Banks – Territorial Reserves  
Declaration of Priority Development  
Preemption Rights  
Announcement of the Project  
Negotiations of Special Licence

## Developer Exactions— Developer Pays

- ✓ **Developer exactions are directly linked to granting land use approvals and permits**
  - Type of exactions:
    - Land dedications
    - In-kind provisions (service or physical facilities)
    - In-lieu fees (e.g., impact, linkage, tap fees)
  - Legal/constitutional issues related to takings
    - “Essential nexus/rough proportionality” test per *Nollan/Dolan/Koontz*
  - Developers pay in downcycle but passed onto property owners (buyers) in upcycle

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Stanford University

## Other Innovative Emerging Tools— Investor Pays

- ✓ **CePAC (Certificate of Potential Additional Construction), Sao Paulo, Brazil**
  - Monetize land use entitlements thru upzoning
    - Additional development right sold in public auctions
    - Proceeds used for affordable housing, infrastructure
    - Improvements made early and independent of potential delay in project development
  - Transparent and market-based value assessment of incremental density
  - Top-down upzoning policy tool to encourage smart growth, TODs
  - Paid for 15% of City’s capital investment needs using less than 0.1% of total developable land

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## CePAC – Certificate of Potential FAR Entitlement

### CHARGE FOR BUILDING RIGHTS



In Curitiba, Brazil, the taller building on the left graphically illustrates the area above the basic FAR of about six stories for which building rights were charged. The taller building on the right also paid for additional building rights but did not demonstrate that fact in its design (C) Gislene Pereira

# CROSSRAIL - LONDON

London levied an incremental tax known as business rate supplement (BRS).

£0.02 supplement on business rates for properties of a rateable value over £55 000 per annum, with this threshold ensuring that smaller premises were exempt and the burden would fall on the larger businesses which were more able to absorb the cost, and most of which were along the line of the proposed route in any case. **The BRS generates around £225 million per annum, which for the GLA could support borrowing of around £3.5 billion.** The levy is expected to fall away once the bonds are fully repaid, which is forecast to be in the 2030s.

**Political risk** of imposing a levy across the city region, the mayor had to determine the rate to be applied, ensure the collection and underwrite the subsequent bond letting process to meet the funding commitments to the project.

The attractiveness of the BRS was that, as a supplement to an existing taxation base, it was easily levied and collected, and the proceeds were very predictable – the income realised has slightly exceeded TfL's forecasts.

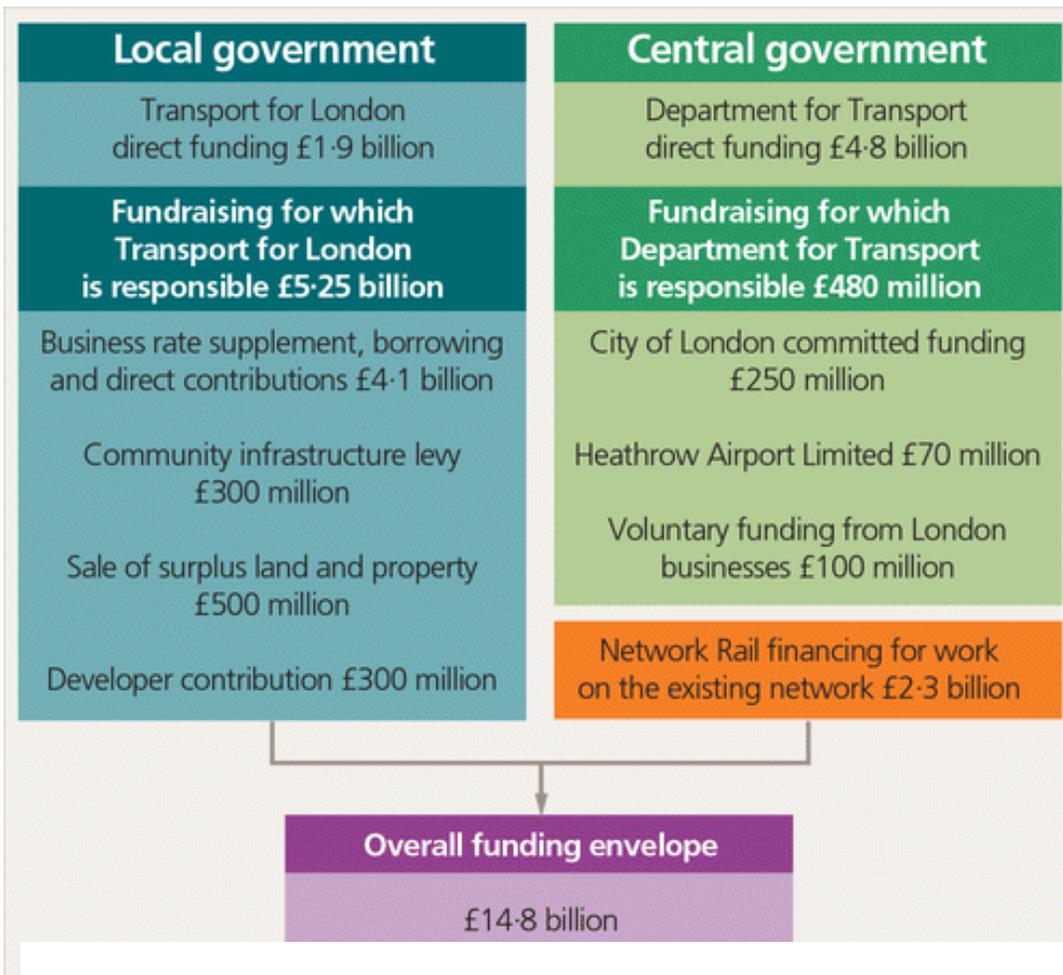
This predictability also made it relatively easy to raise capital to be repaid through its proceeds.

## CROSSRAIL – LONDON

### Transit Oriented Development

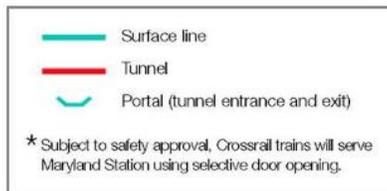
The £14.8 billion Crossrail project to deliver the new Elizabeth line east–west railway across London is the UK's largest transport project. Possible only through an innovative programme of finance, funding and value capture, which saw London business and future passenger revenues contribute approximately two thirds of the cost.

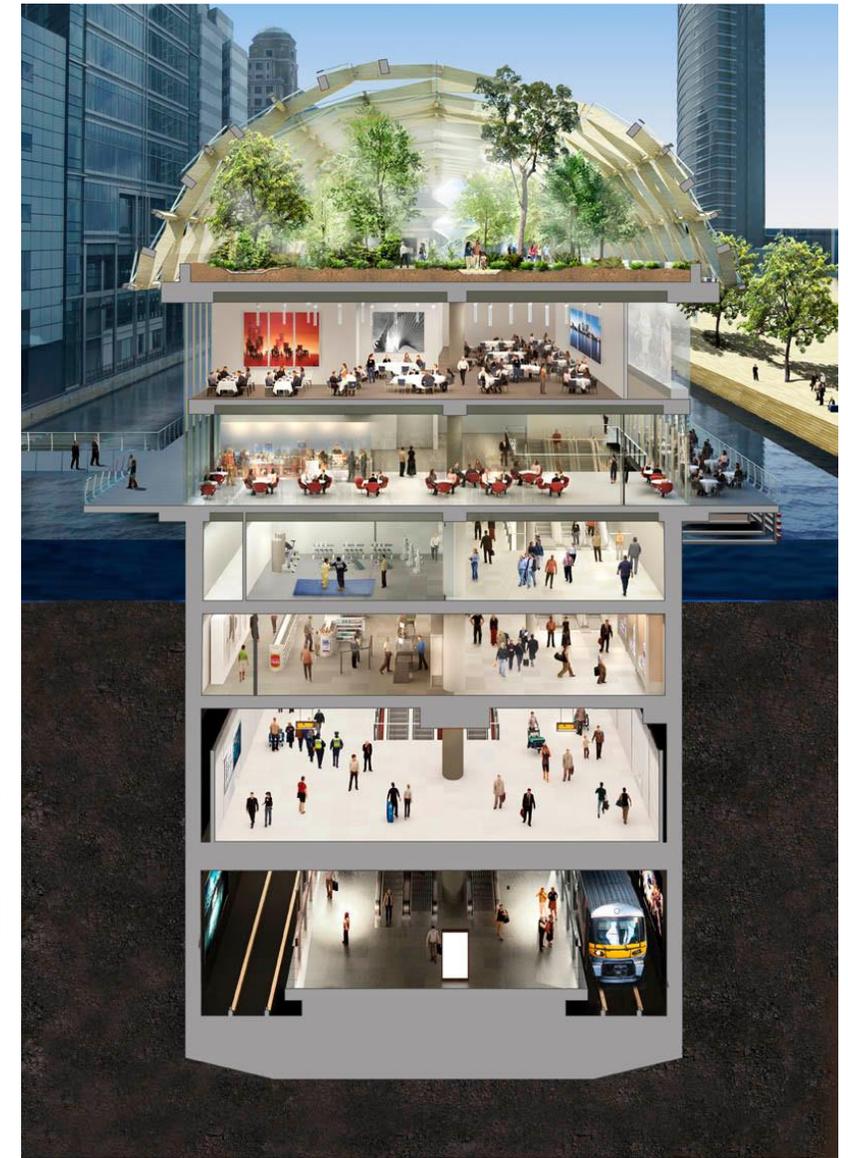
The commercial realisation of the value potential from property development opportunities above or in the vicinity of Crossrail stations has formed an important part of Crossrail's core funding proposition. As a consequence, the design of stations, over-station developments (OSD) and the surrounding urban realm was delivered on an integrated basis at a dozen key sites.



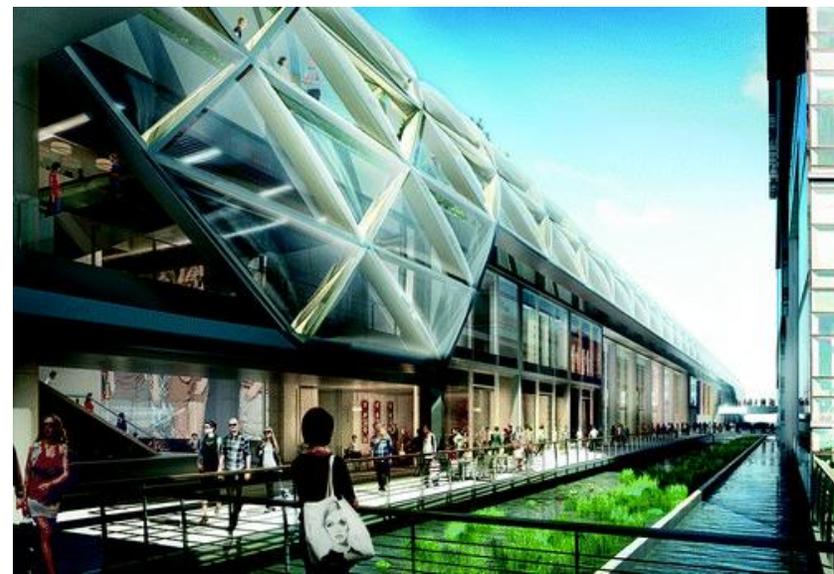
Crossrail

Route Map





Canary Wharf Station topside development by Canary Wharf Group



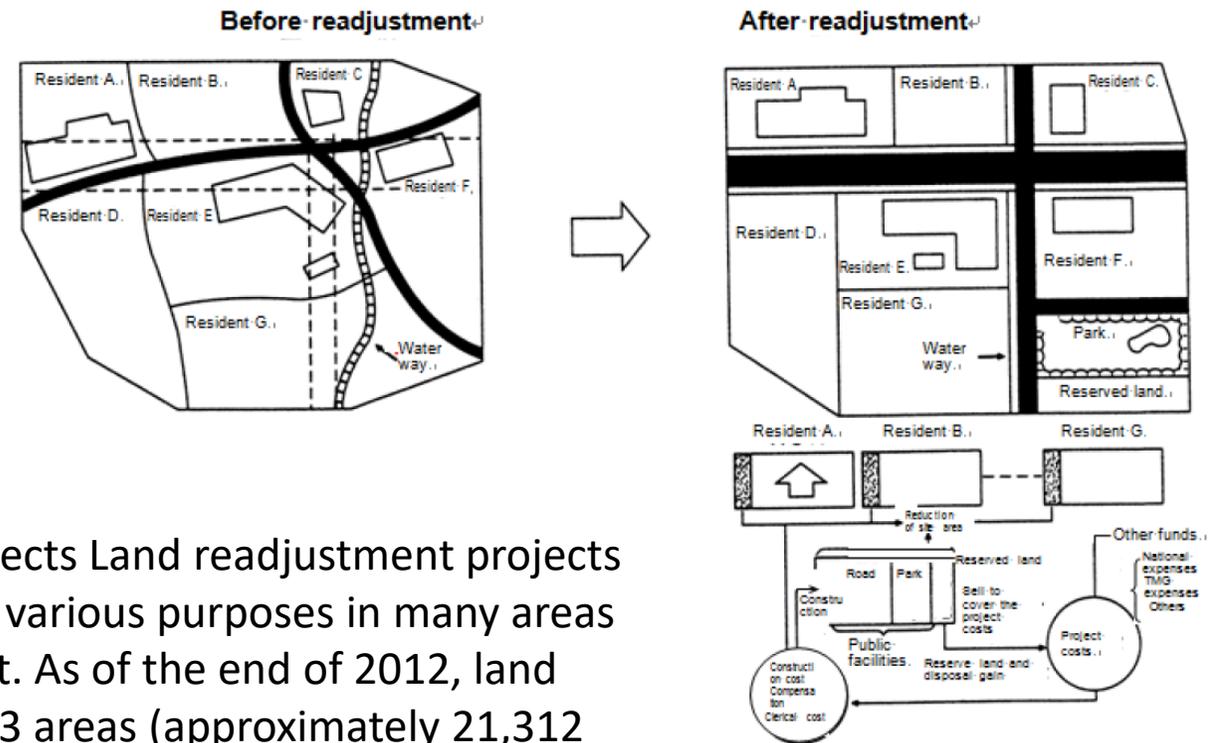
Canary Wharf Station with topside development



Aerial view of Woolwich Station with Berkeley Homes Topside developments

## An illustration of land readjustment

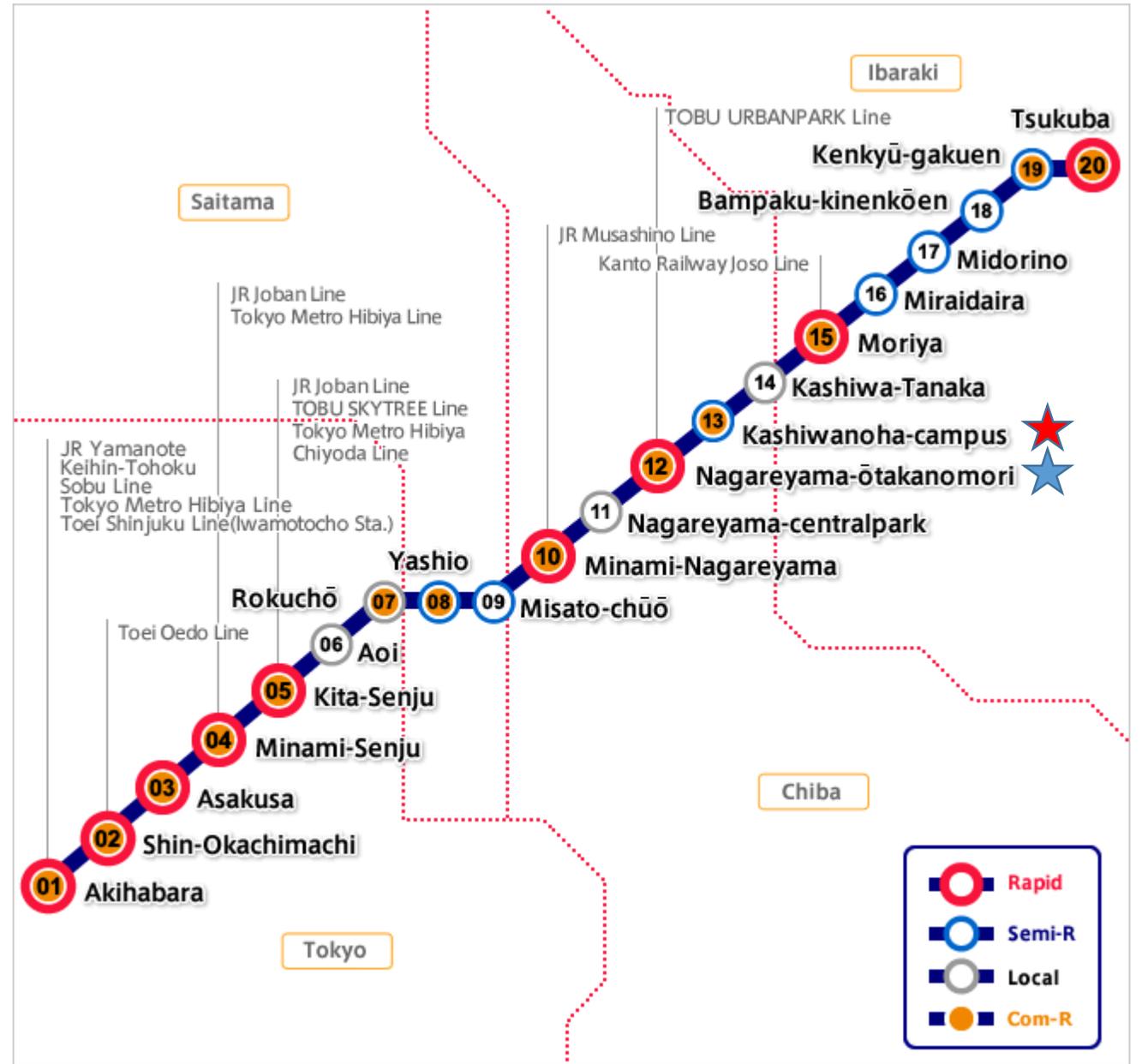
# Land Readjustment - Japan



Implementation Status of Land Readjustment Projects Land readjustment projects in Tokyo have been utilized in order to respond to various purposes in many areas as a method of comprehensive town development. As of the end of 2012, land readjustment projects have been completed in 593 areas (approximately 21,312 ha)

Land Readjustment Projects in Redevelopment of Built-up Areas In the Mizue Station West, Shinozaki Station East, Rokucho, Hanahata North, and Tabata districts, the Tokyo Metropolitan Govt (TMG) are involved in the areas along the Toei Shinjuku Line and the **Tsukuba Express Line**

The Tsukuba Express Project characterizes the development of public transport systems and housing development along the line under a special law to facilitate it, and is a representative example of Transit-Oriented Development (TOD) cases that have taken place in recent years in Japan. The TX Project brought a major change - emphasizing "*bus and train rides*" combining the use of TX and highway bus services, forming a multimodal transport network for the area.





## Suburban-type transit-oriented development

Tsukuba Express Town



Nagareyama-Otakanomori district

★ Nagareyama - Otakanomori



★ Kashiwanoha Smart City Project

Mitsui-Fodusan Group  
Long Term Vision 2025

Autonomous urban development through partnership among the public sector, private sector and academia is being advanced based on a flat platform that enables anyone, including universities, companies and citizens, to participate in urban development.

# *Land Reclamation Value Capture Financing*

## Augment property value better through large scale Integrated Development

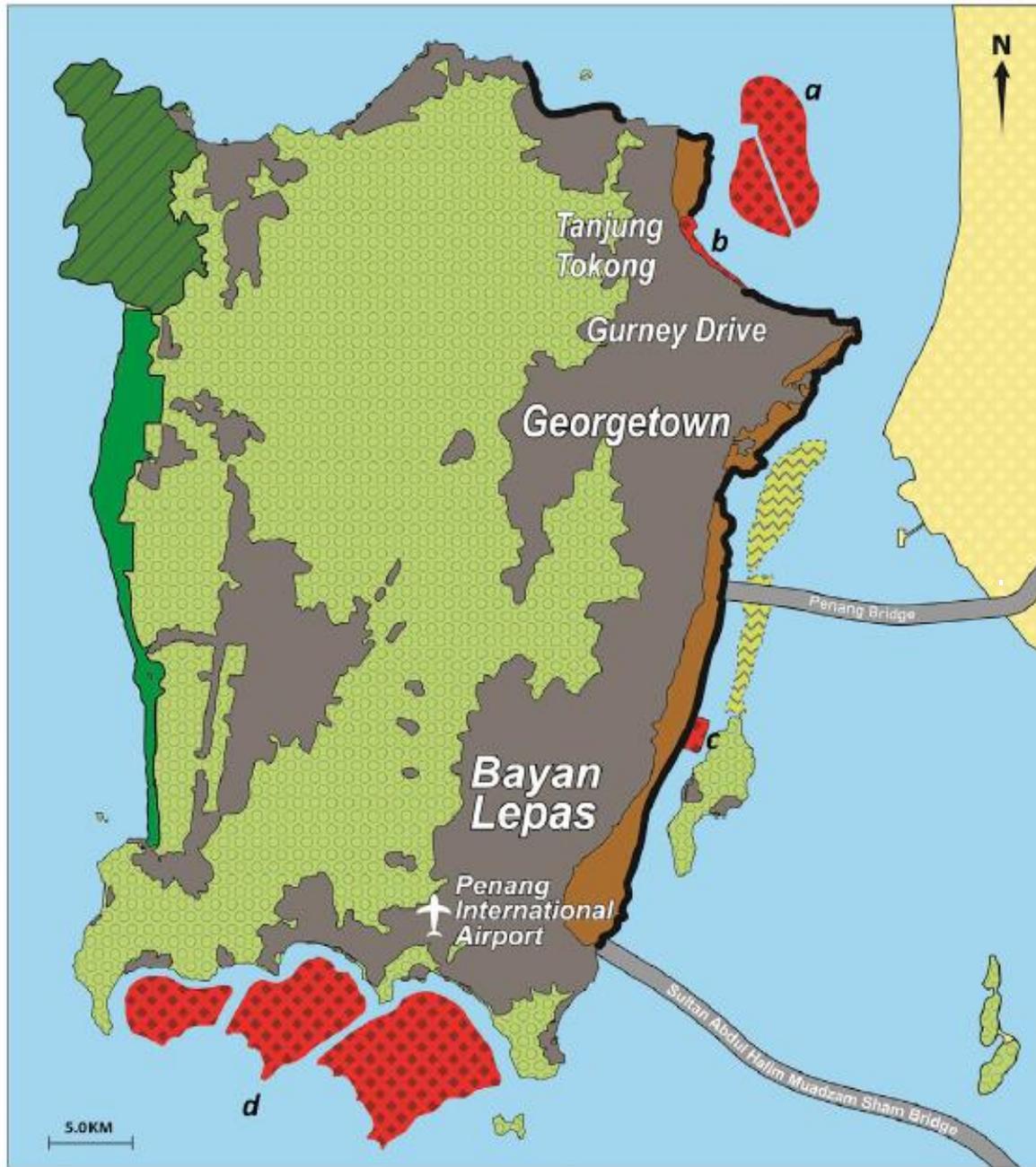
Possible to increase Plot ratio/intensity of development – TOD compact development within easy walking distance can accommodate broad mix of uses, such as housing, offices, commercial retail, F&B, services shops.  
Minimize impact of traffic

## Ensure ridership

Commuters working in the new development, commuters (clients) drawn to the new development

## Optimize costs and benefits of integration within the railway & development entity

Minimize risk of conservative structural overprovision for appropriate support in design for integration and linkages



## LEGEND

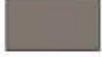
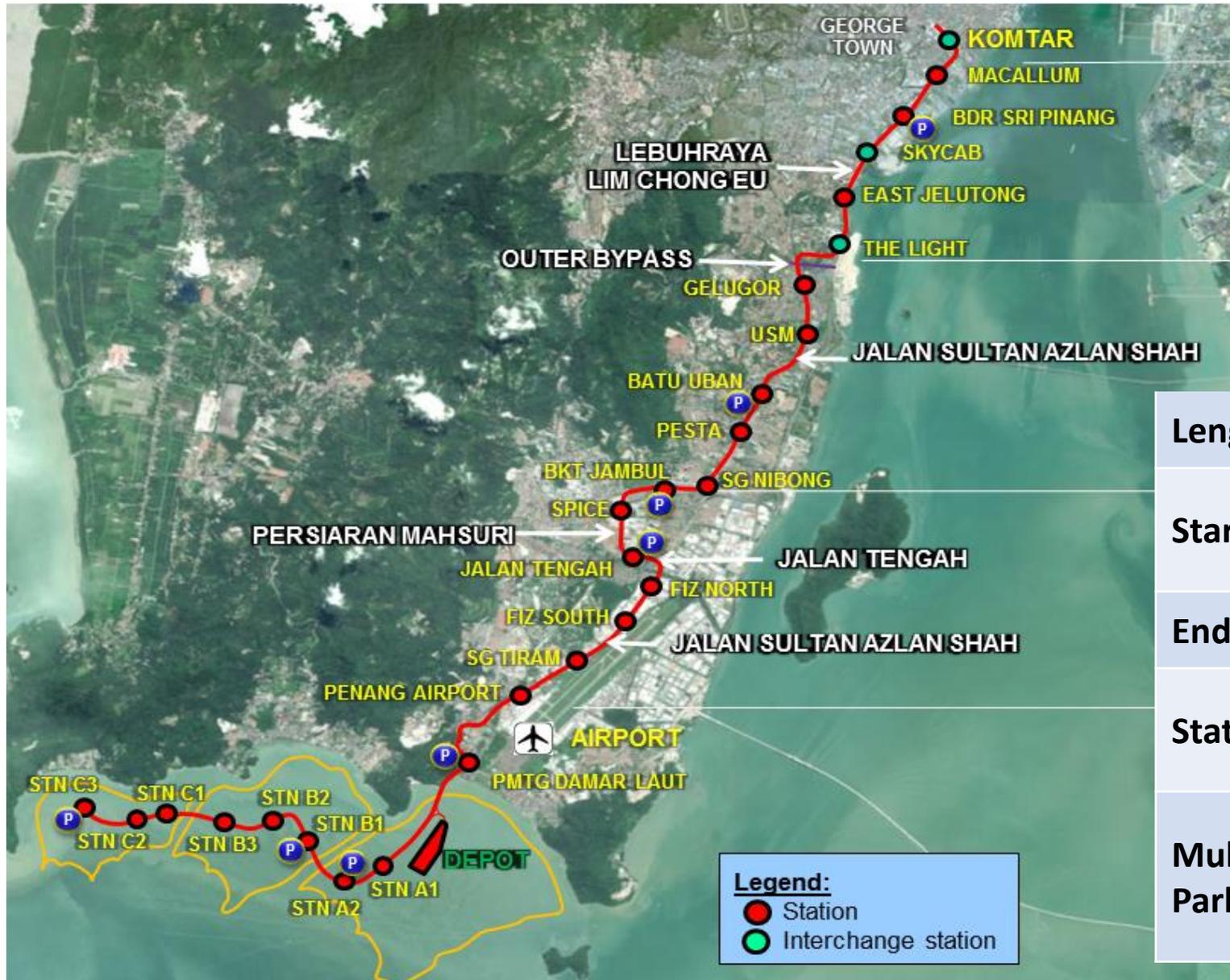
-  Forest
-  Mangrove
-  Urban Area
-  Reclaimed Area
-  Proposed Reclamation
-  Seagrass Meadow
-  Penang National Park
-  Artificial Coastline

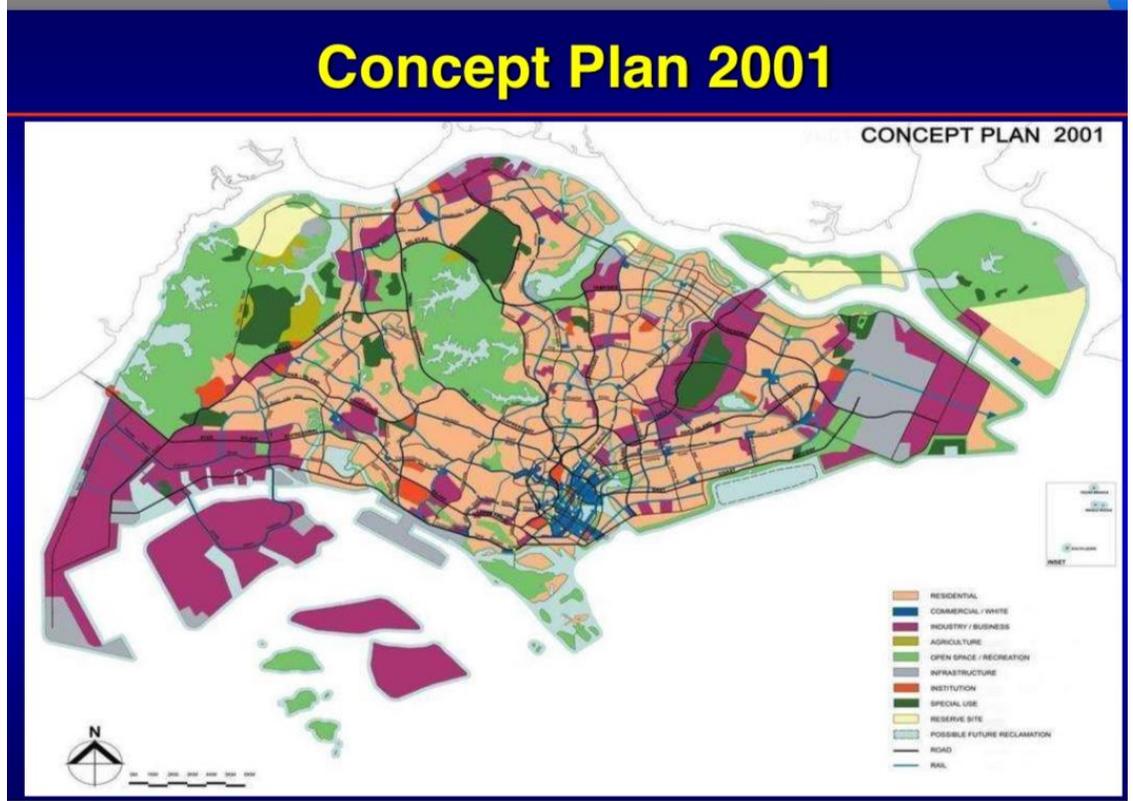


Fig. 4. Drone image indicating Pulau Jerejak, felled mangroves, and reclamation underway for both Gurney Wharf and an artificial island taken in April 2017. (Image by Hong Chem Wern).

# Bayan Lepas LRT Alignment



<b>Length</b>	29.5 km
<b>Start</b>	George Town
<b>End</b>	Island C
<b>Stations</b>	27 nos. (8 on PSR)
<b>Multi-storey Park &amp; Ride</b>	8 nos. (3 on PSR)

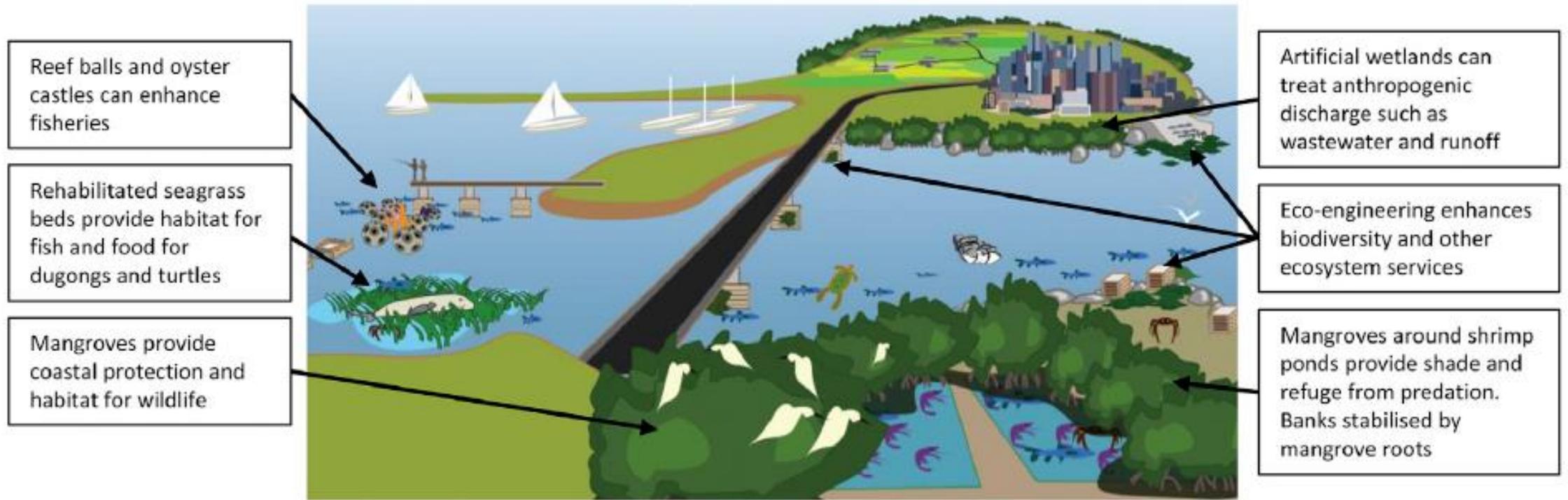


# Jurong Lake District



**A Sustainable Lakeside Destination for Business & Leisure**

(b) Artificial island with eco-engineering



**Fig. 5.** Conceptual diagram, providing examples of (a) an artificial island without eco-engineering, and (b) the way in which eco-engineering can be applied on an artificial island as a management solution. Figure produced by by Shaun Lewin (Plymouth University).

# Development Strategy

## Design out the conflicts & constraints

- Land Bank – existing, create new ones, consolidate remnants of irregular plots of land, land readjustment
- Optimize Transit Alignment and Urban design
- Identify station area development potentials -TOD
- Intermodal hub
- Underground & overhead pedestrian network plan
  - **Streetscape improvements**
  - **Historic preservation**
  - **Green space**
  - **Including barrier free commuter provisions**

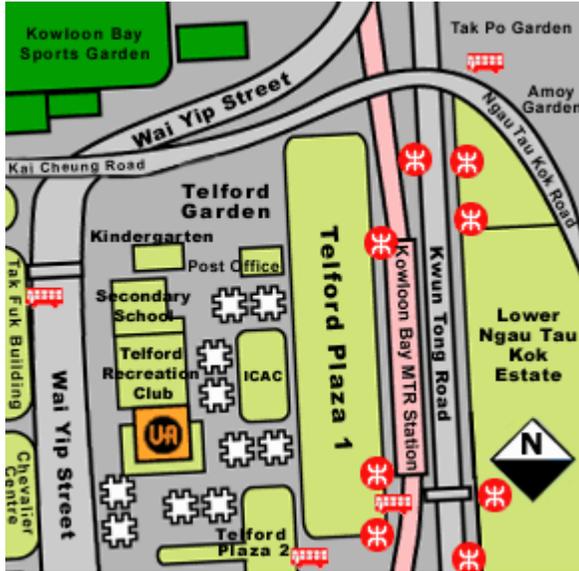
## Hong Kong Case : Rail + Property (R+P)

### Effective tool to finance railway construction

- Government collects land premium from operator before rail construction, and increased tax revenues with appreciation of property & land value going forward
- Construction costs of rail & development transferred to operator
- Development is constructed together with rail line
- Cross subsidization of rail and property development

Allow developers and Transit Authority to respond to market needs, and leverage upon development trend & latest construction processes.

# Hong Kong Case: Rail + Property (R+P)

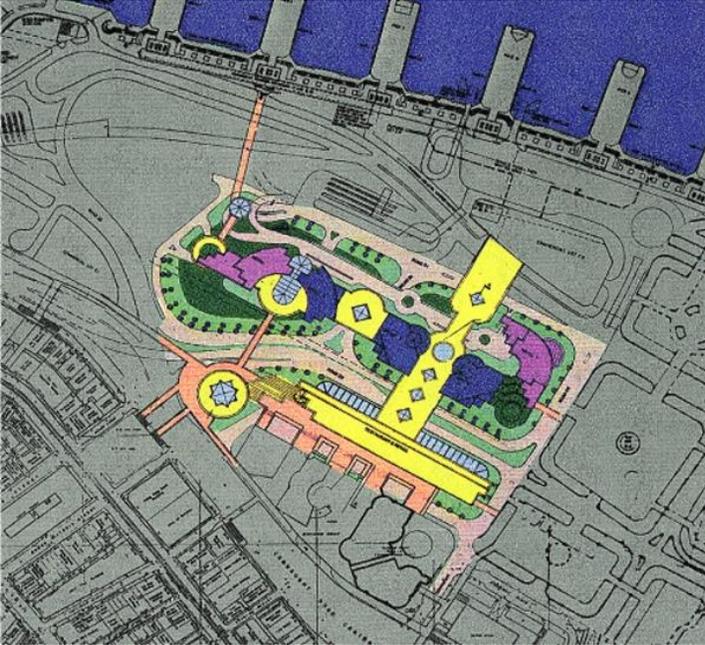


**Kowloon Bay  
Station**



**Telford Garden and Plaza - R+P Project  
Mixed-Use: Residential, Shopping, Office**

## Hong Kong Case: Rail + Property (R+P)



### Hong Kong Station

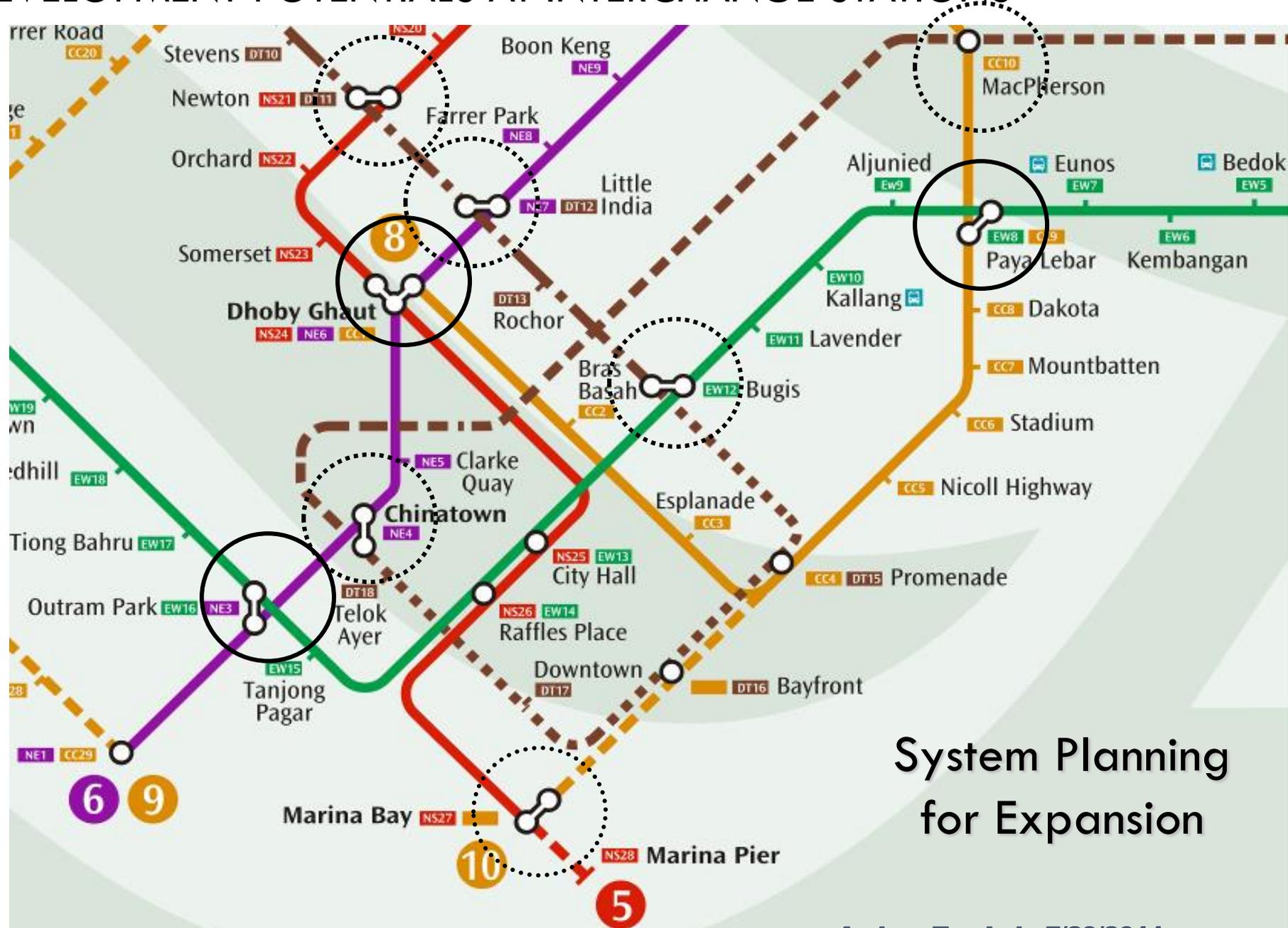
MTRC owns 18 floors  
of the office tower as an asset  
in the integrated  
development sale



# Singapore Case

1. Transit infrastructure projects are important components of the nation's economic development
2. Separate government agencies have focused competence but collectively act on “whole of government” basis
  - Ministry of Finance – provides complete project funding
  - LTA's technical competence on transit design, project construction and implementation
  - URA is the competent authority for the nation's Master Plan to optimize landuse, development intensity and transit alignment. URA also implements the government land sales program with other government agencies.
3. LTA & URA proactively collaborate for development integration and pedestrian connectivity upfront

# DEVELOPMENT POTENTIALS AT INTERCHANGE STATIONS



System Planning  
for Expansion

# VALUE CREATED, VALUE CAPTURE

**Key Strategy:**

**Timing the Tender**

**Leverage on network growth & interchanges**

**Imposing appropriate Technical Conditions of Tender to optimize**

**LandUse**

**Plot ratio**

**Connectivity**

**Award to developer with design and price that provides best value above Reserved Price**

# Orchard ION MRT: Before

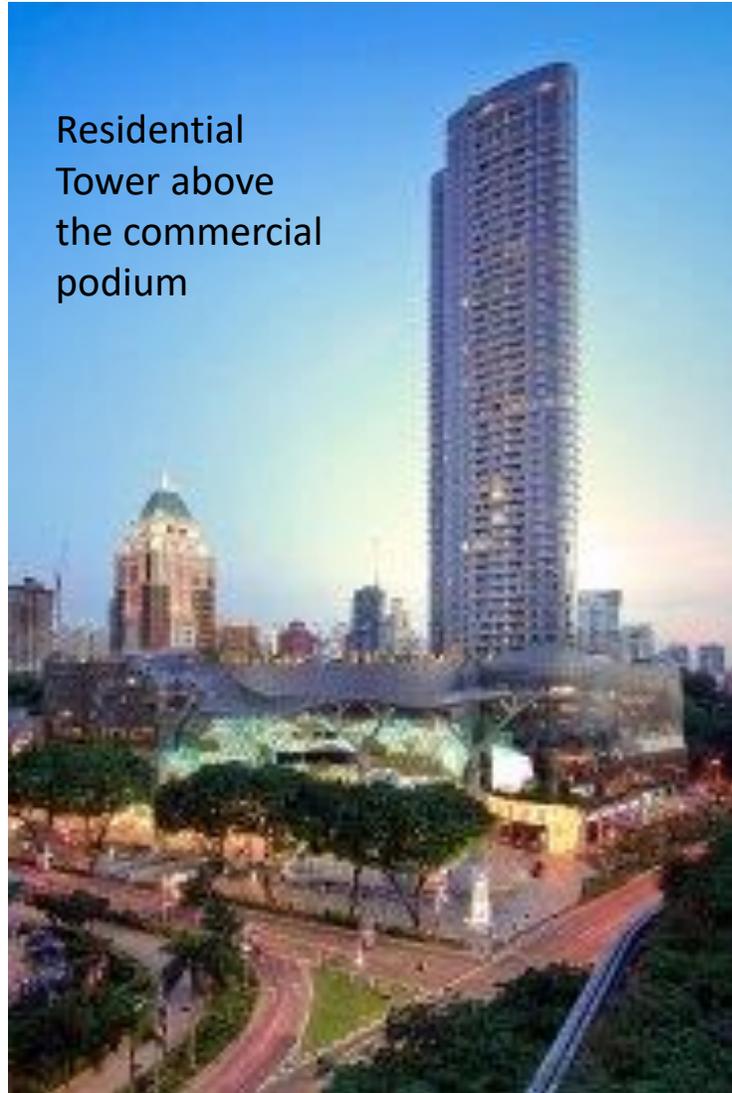


# *Orchard ION MRT: after*

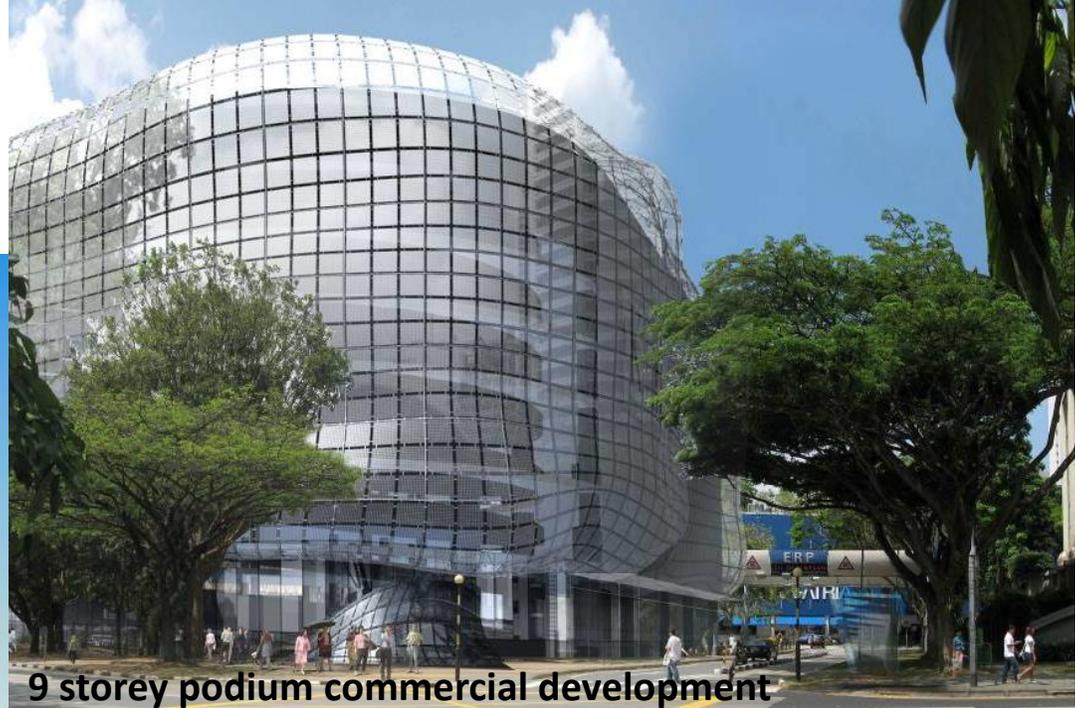


**Audrey Teo Loh, 7/29/2011**

# Orchard ION MRT: After



Residential  
Tower above  
the commercial  
podium

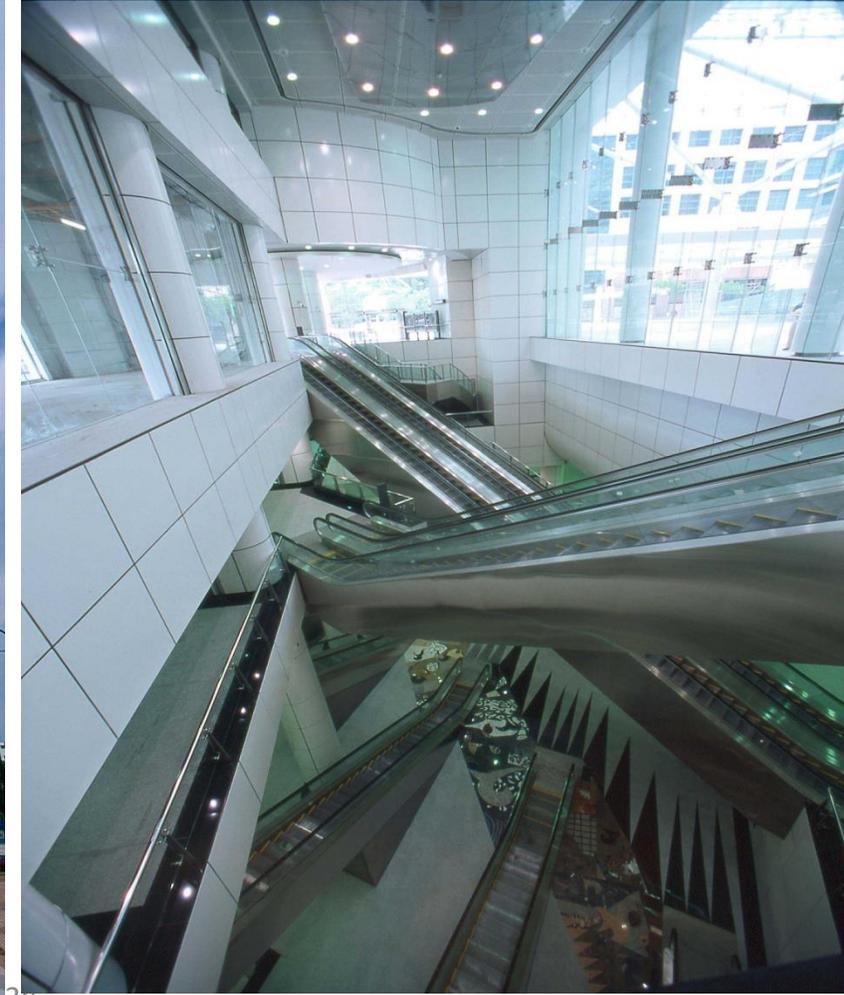


9 storey podium commercial development  
above the Orchard MRT station

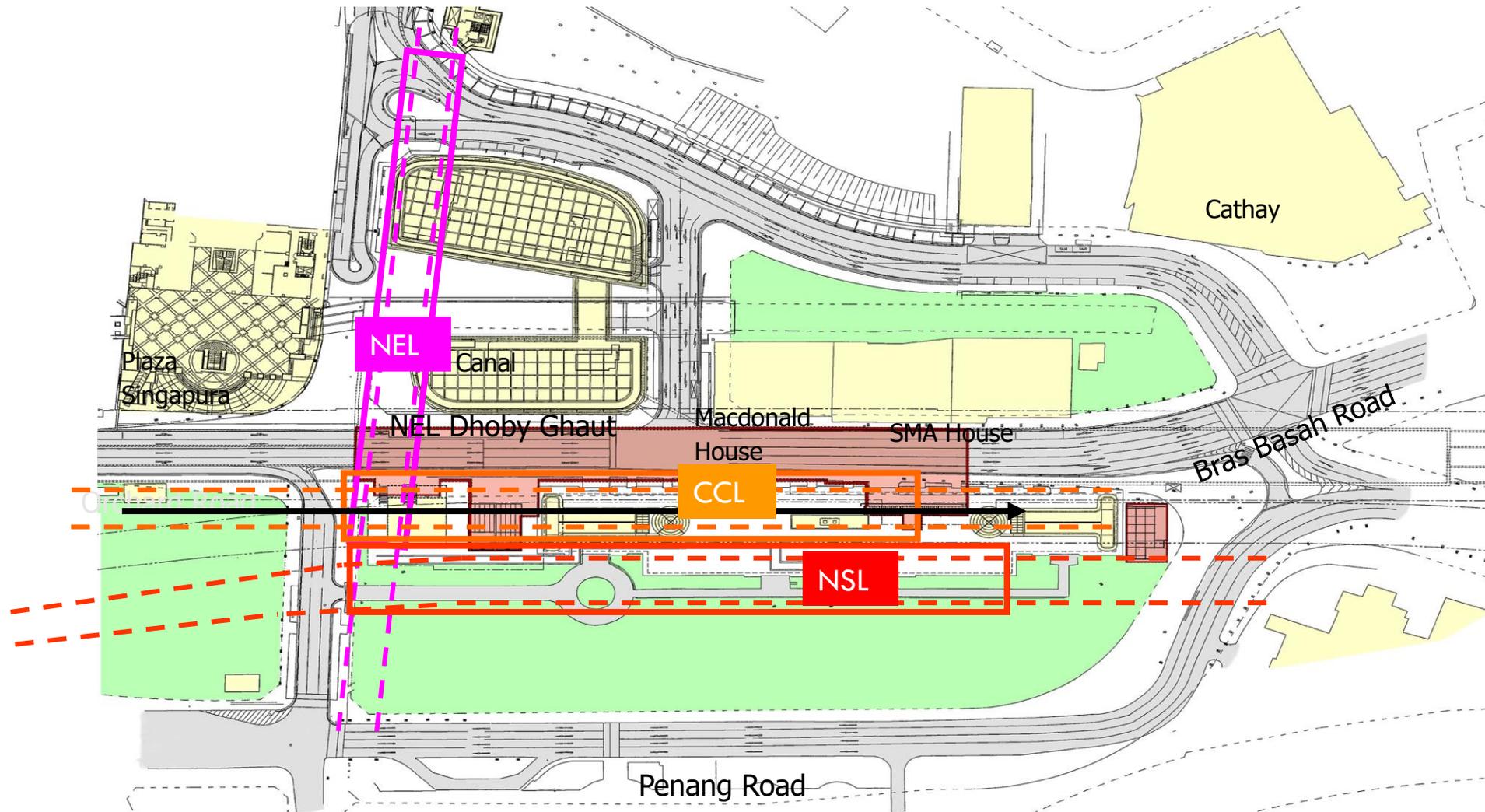


Plaza area

# Dhoby Ghaut Interchange



# Dhoby Ghaut Interchange: Integration of 3 Stations and Commercial Development

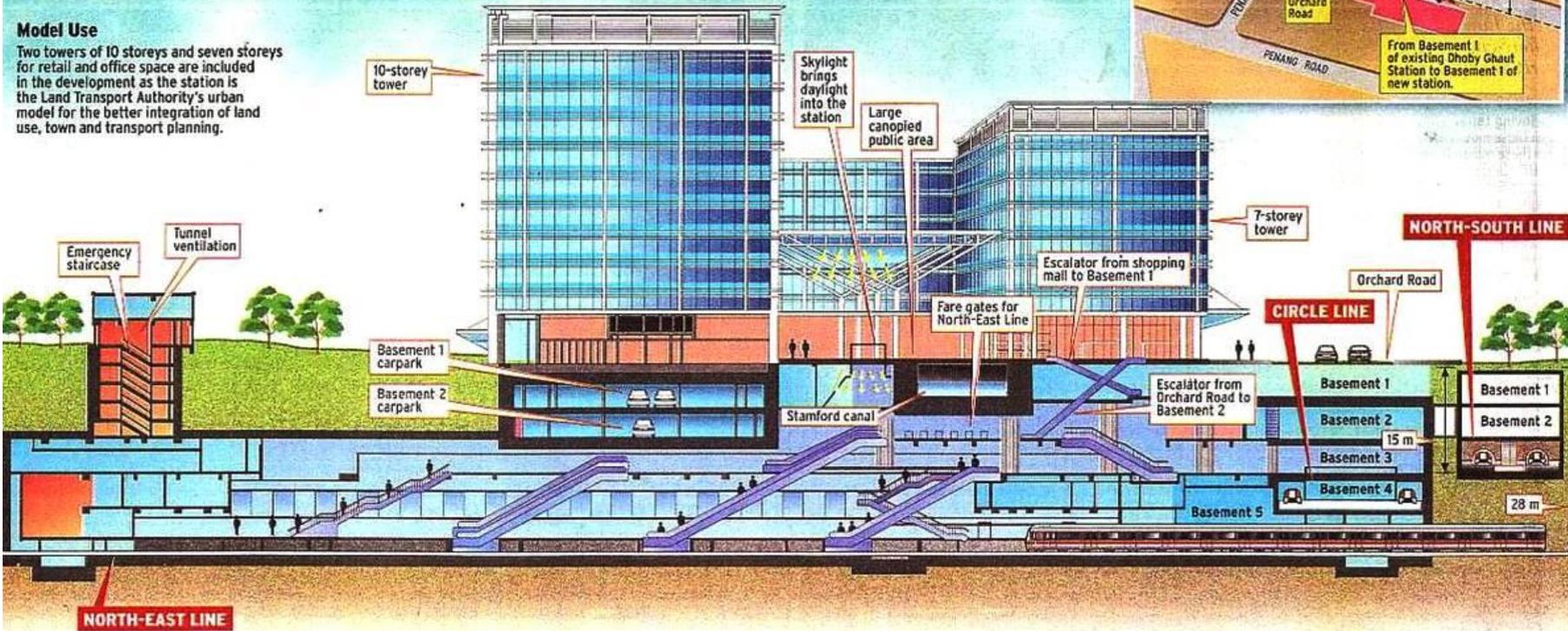
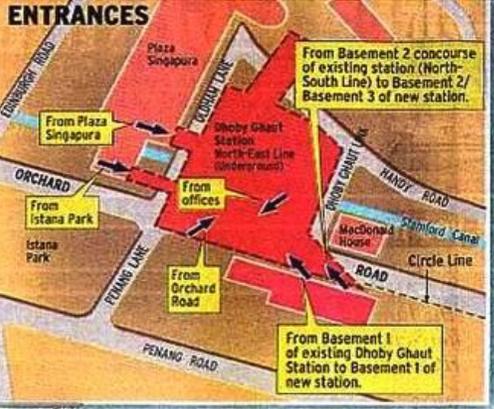


# Dhoby Ghaut Interchange

## ONE GIANT INTERCHANGE

The Dhoby Ghaut interchange, with five underground levels, will be the biggest station in the MRT network. **G. CHANDRADAS** and **LIM YONG** bring you details of the \$268-million station complex, which will have more than 20,000 people going through it in an hour during peak periods.

**Model Use**  
Two towers of 10 storeys and seven storeys for retail and office space are included in the development as the station is the Land Transport Authority's urban model for the better integration of land use, town and transport planning.



# INTEGRATED TRANSPORT HUB

## Clementi Bus Interchange



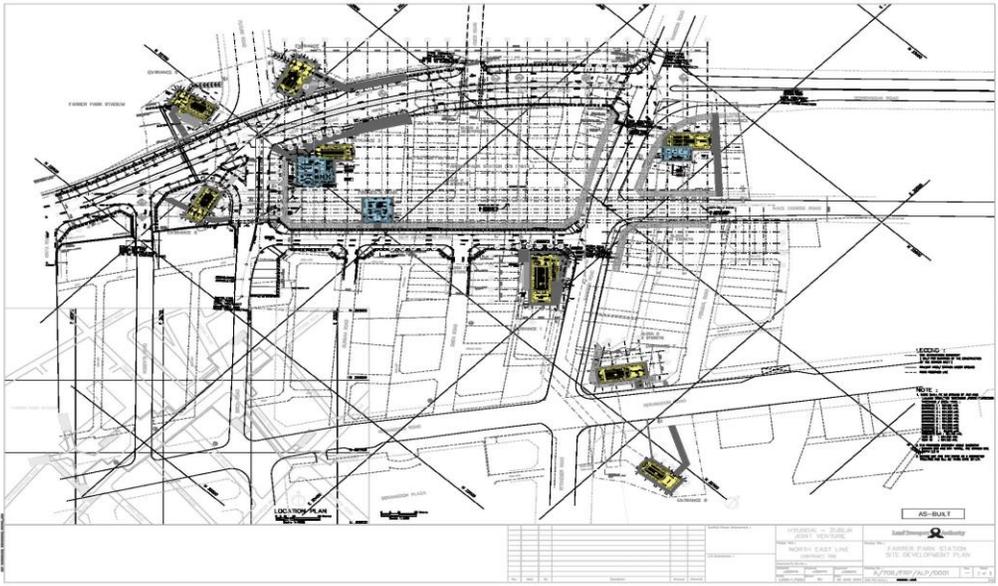
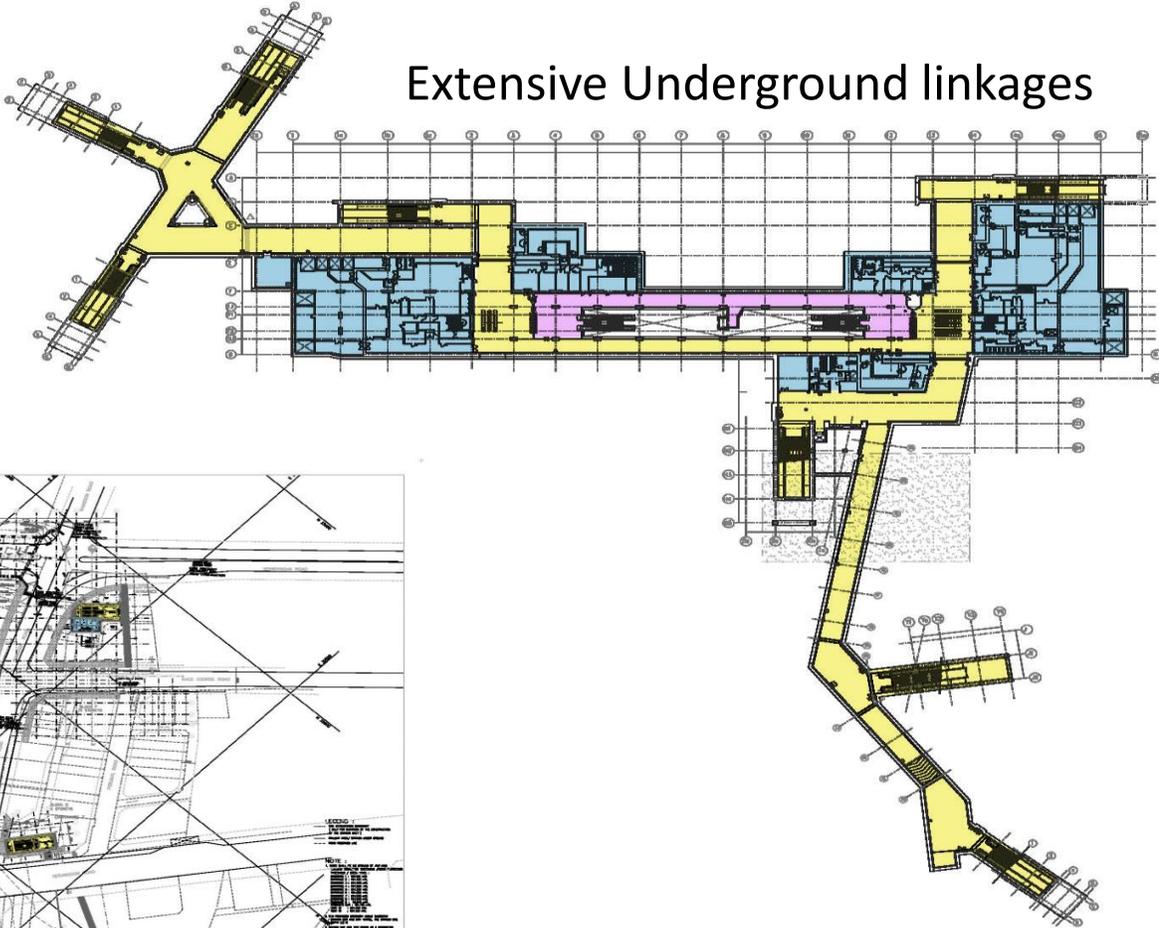
**Residential and Commercial developments are above a Bus Interchange and directly linked to the elevated CLEMENTI MRT Station**



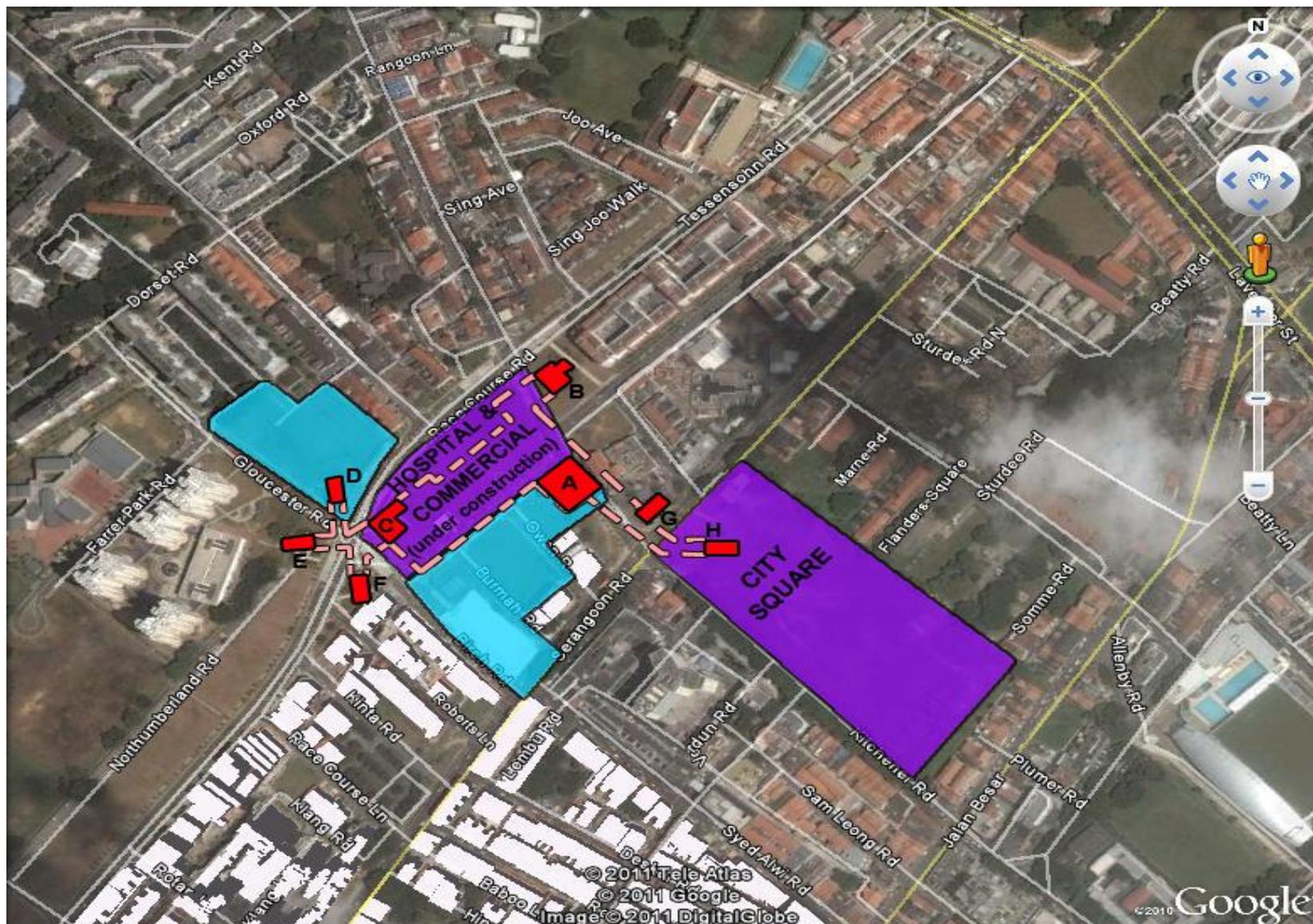
# Creating Development Opportunities

## Farrer Park Station

**ADDITIONAL ENTRANCES**  
created to extend the  
reach of the station to  
vacant plots



# Extending the Reach of the Transit System to surroundings



Audrey Teo Loh, 7/29/2011

**FARRER PARK STATION**

# VALUE CREATED, VALUE CAPTURED

@ FARRER PARK STATION away from the City Business District

URA's record for June 28 to July 5, 2011 showed a 570sqft studio apartment at **City Square Residences** sold for \$975,000, a record at \$1,709psf. Another unit, a 840sqft two-bedroom sold at \$1.39 million, or \$1,656psf. Connectivity to the MRT Station and the lifestyle commercial mall integrated development **City Square Mall** is a primary contributing factor



Audrey Teo Loh, 7/29/2011

# BAYFRONT STATION at the Marina Bay Area

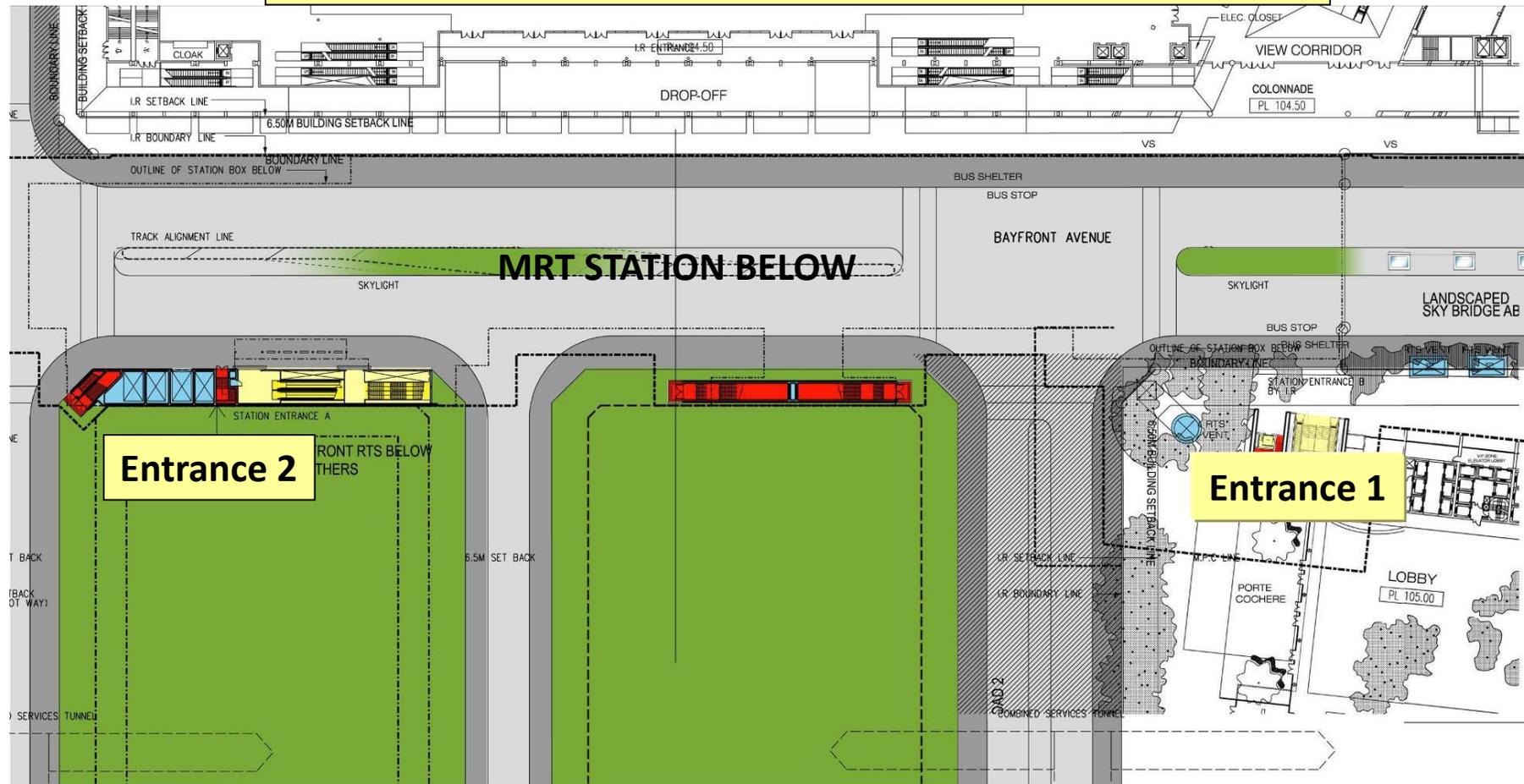


MRT Stations integrated with Marina Bay Sands, A Casino, Hotel and  
Convention Center & Shopping Complex<sup>45</sup>

**Audrey Teo Loh, 7/29/2011**

# BAYFRONT STATION at the Marina Bay Area

Additional Entrances integrated within development



# **BAYFRONT STATION** at the Marina Bay Area



**ADDITIONAL  
VALUE CAPTURE  
AT ADJACENT VACANT PLOTS  
TO LEVERAGE on EXISTING ICONIC  
DEVELOPMENT AND DIRECT  
CONNECTION TO THE BAYFRONT  
MRT STATION**

**Audrey Teo Loh, 7/29/2011**

*Economic Modeling:*  
Monitor and Research Trends & Distribution

**Cross-sectional and Time series analyses for  
Station locations**

**Critical to have data base, eg**

**Real Estate Data & Information (URA Website)**

**Sectors included Private Residential, Commercial and  
Industrial.**

Property Market Updates

Property Transactions with Caveats Lodged

Rental Details

Prices of Units Sold in Private Residential Properties

Private Residential Projects in the Pipeline

# Economic Modeling: Two Simplified Models

## Hong Kong

- **2 Sources of Value:**
  1. Current value: \$A
  2. Rental revenue: \$B/year for 25 years

- **Value Today:**

$$V = A + \sum_{i=1}^{25} \frac{B}{(1+r)^i}$$

Assumption: Average annual discount rate  $r$

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## Singapore

- **1 Source of Value:**
  - ▣ Proceeds from sale in 25 years
    - Current value: \$A
    - Appreciation rate in year  $i$ :  $x_i$

- **Value Today:**

$$V = A \frac{\prod_{i=1}^{25} (1+x_i)}{(1+r)^{25}}$$

# *Economic Modeling:* Simple Unified Model

- Current value of land: \$A
- Average annual discount rate:  $r\%$

## Hong Kong

- Annual rental revenue:  $y\%$  of current value
- Value Today:

$$V = A + \sum_{i=1}^{25} \frac{sA}{(1+r)^i}$$

## Singapore

- Average annual appreciation rate:  $x\%$
- Value Today:

$$V = A \frac{(1+x)^{25}}{(1+r)^{25}}$$

# Economic Modeling: Breakeven point

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- Calculating the breakeven point:

$$A + \sum_{i=1}^{25} \frac{sA}{(1+r)^i} = A \frac{(1+x)^{25}}{(1+r)^{25}}$$



$$x = (1+r) \left( 1 + \sum_{i=1}^{25} \frac{s}{(1+r)^i} \right)^{\frac{1}{25}} - 1$$

- Example:

- Rental = 1%, Discount = 5%  $\leftrightarrow$  Appreciate at 5.6%
- Rental = 1%, Discount = 3%  $\leftrightarrow$  Appreciate at 3.7%

# Key Takeaways – Growing Popularity

- Re-democratization, increased social awareness, demands for equitable public policy responses
- Changing attitudes toward privatization and public-private partnership
- Influence of multilateral agencies Funding (UN-Habitat, ADB, World Bank, Asian Infrastructure Fund)
- Sustainable Economic Development and Fiscal decentralization
- Progressive strategies for Urban Planning and Management– Green initiatives, low carbon approach, Livable cities – future proofing for change
- Pragmatism - Integrated Transport Hub as the model for Public Transport and Development, Barrier-Free Accessibility, Universal Design