



Smart Planning for a Sustainable and Resilient City

Sharing Singapore's Experience

LOH Teck Hee

Group Director

Design & Planning Lab

Urban Redevelopment Authority

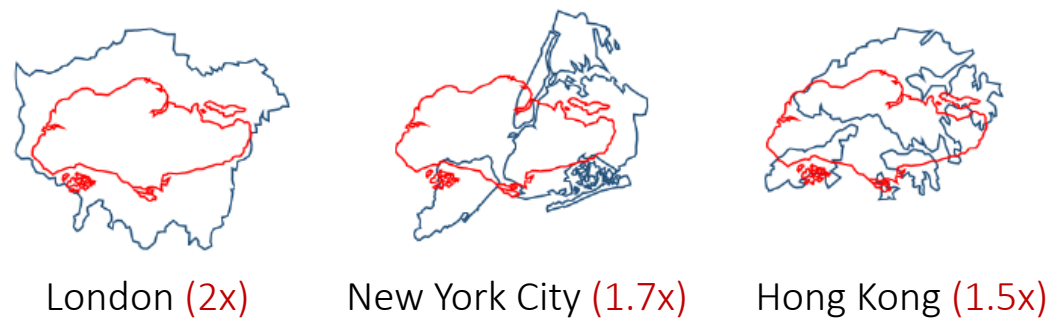


URBAN
REDEVELOPMENT
AUTHORITY

Singapore's National Land Use Planning and Conservation Authority

MISSION: To make Singapore a Great City to Live, Work & Play

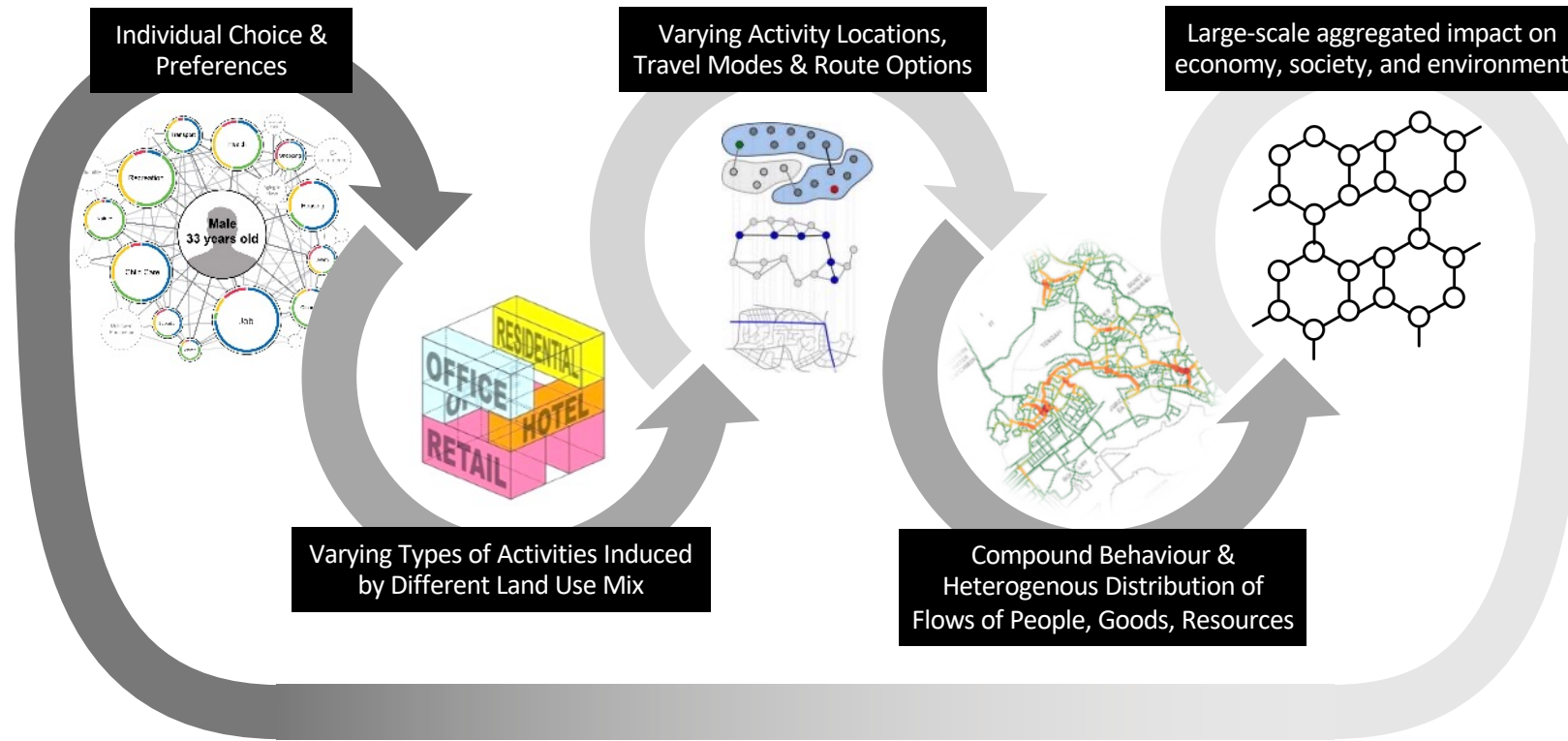
SINGAPORE IS A SMALL ISLAND WITH **MANY DIFFERENT NEEDS** TO ACCOMMODATE



LAND NEEDS	Housing	Commerce	Industry
	Port	Defence	Airport
	Water Catchment	Culture & Heritage	Greenery & Parks
SEA NEEDS	Anchorage / Fairways	Aquaculture	Landfill

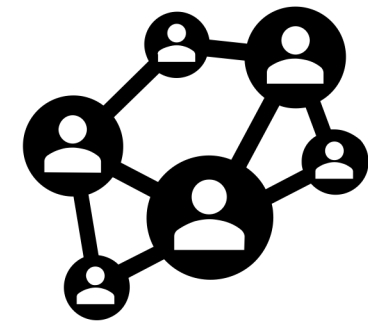
LAND USE PLANNING WORKS WITHIN A **COMPLEX ECO-SYSTEM**

Over multiple dimensions, space, and timescales



Involving multiple stakeholders with diverse objectives

- Different Government Agencies
- Businesses
- Interest / Civic Groups
- Residents / Communities



WE ADOPT A **LONG-TERM PLANNING APPROACH** TO STEWARD OUR LIMITED RESOURCES AND DEVELOP SUSTAINABLY



+ **FLEXIBILITY**
RESILIENCE

ECONOMIC

Sustain a robust and vibrant economy

SOCIAL

Provide a good quality living environment

ENVIRONMENT

Develop in an environmentally responsible manner

LAND & SEA

Optimise our limited land and sea space

WE USE DATA AND ANALYTICS TO MANAGE COMPLEXITY AND INCREASE AGILITY

High dimensionality of problems



Model & simulate “what-if” scenarios

Qualitative nature of problems



Frame issues with quantitative indicators

Rapidly changing environment



Respond quickly and decisively to emerging events

Need for flexibility in the future



Generate scenarios to optimise across multiple needs

Numerous stakeholders and trade-offs

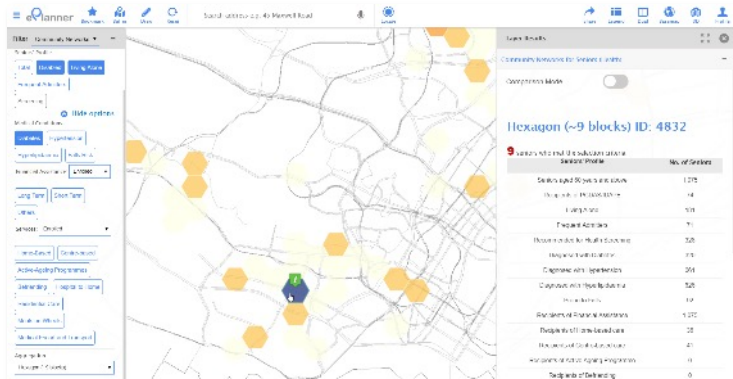


Collaborate iteratively with many stakeholders

DIGITAL PLANNING AS AN ECOSYSTEM: COLLABORATING WITH AGENCIES

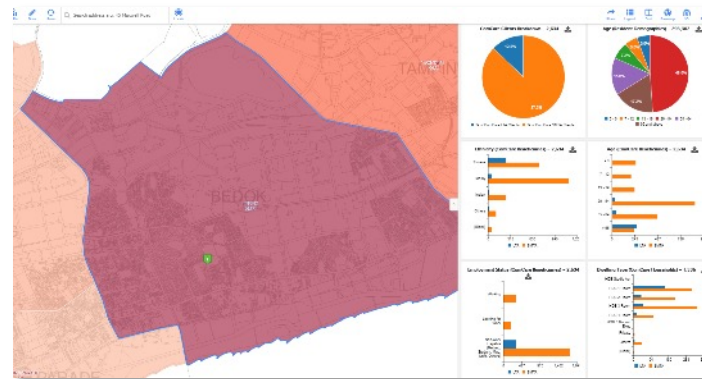
Community Network for Seniors

Identify locations/concentrations of elderly with different profiles



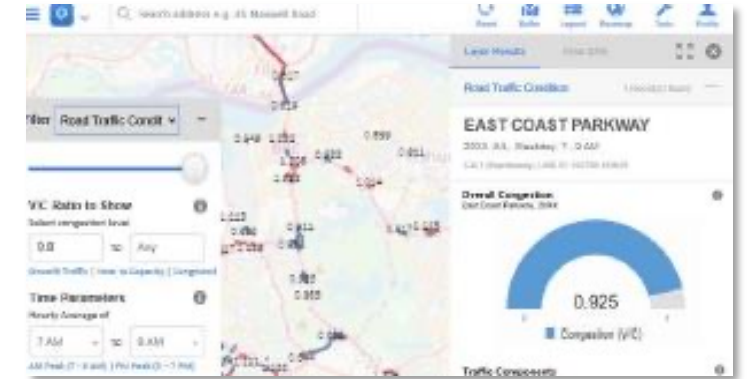
Strengthening Social Services

Understanding the spatial distribution of Community Care Facilities clients



Infrastructure Planning

Land use and mobility simulation with localised scenario testing for traffic



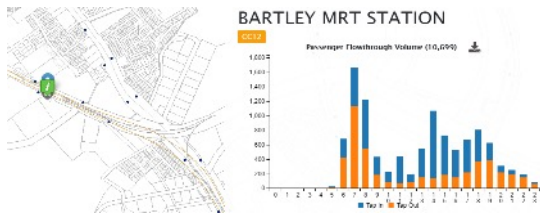
All diagrams are for illustrative purposes only.



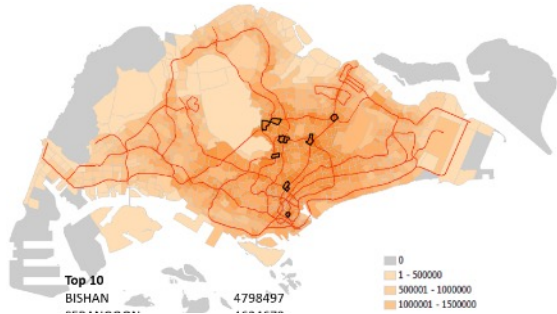
USING TRANSPORT DATA TO ASSESS CONNECTIVITY AND CATCHMENT

Descriptive

E.g. What is the commuter volume boarding / alighting at a MRT station?

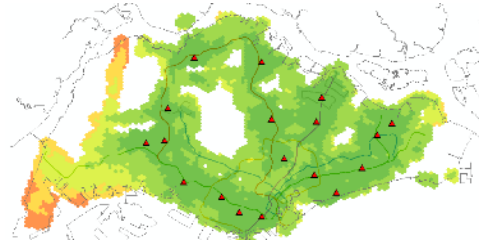


E.g. How many people can commute to work by public transport in 45 mins?

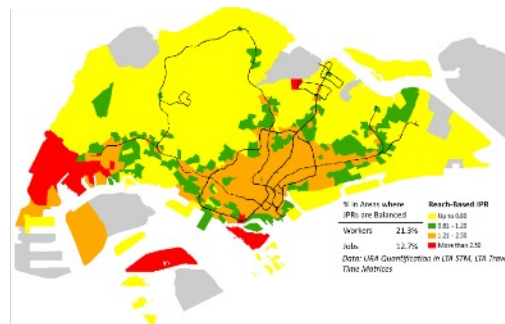


Diagnostic

E.g. Are facilities sited within 30 mins by public transport from all residential areas?



E.g. Where are imbalances in Job Provision Ratios based on public transport reach?



Predictive

E.g. How does public transport travel time change with a new MRT line?



E.g. How does redistributing workers and jobs improve workers' job reach?

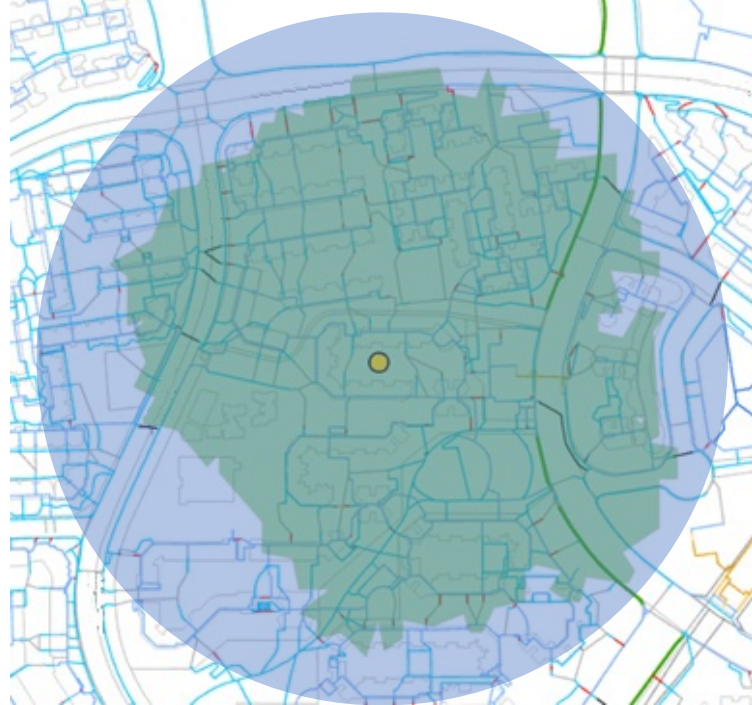


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USING NETWORK DATA TO IMPROVE ACCESSIBILITY AND BETTER INFORM ROUTE PLANNING

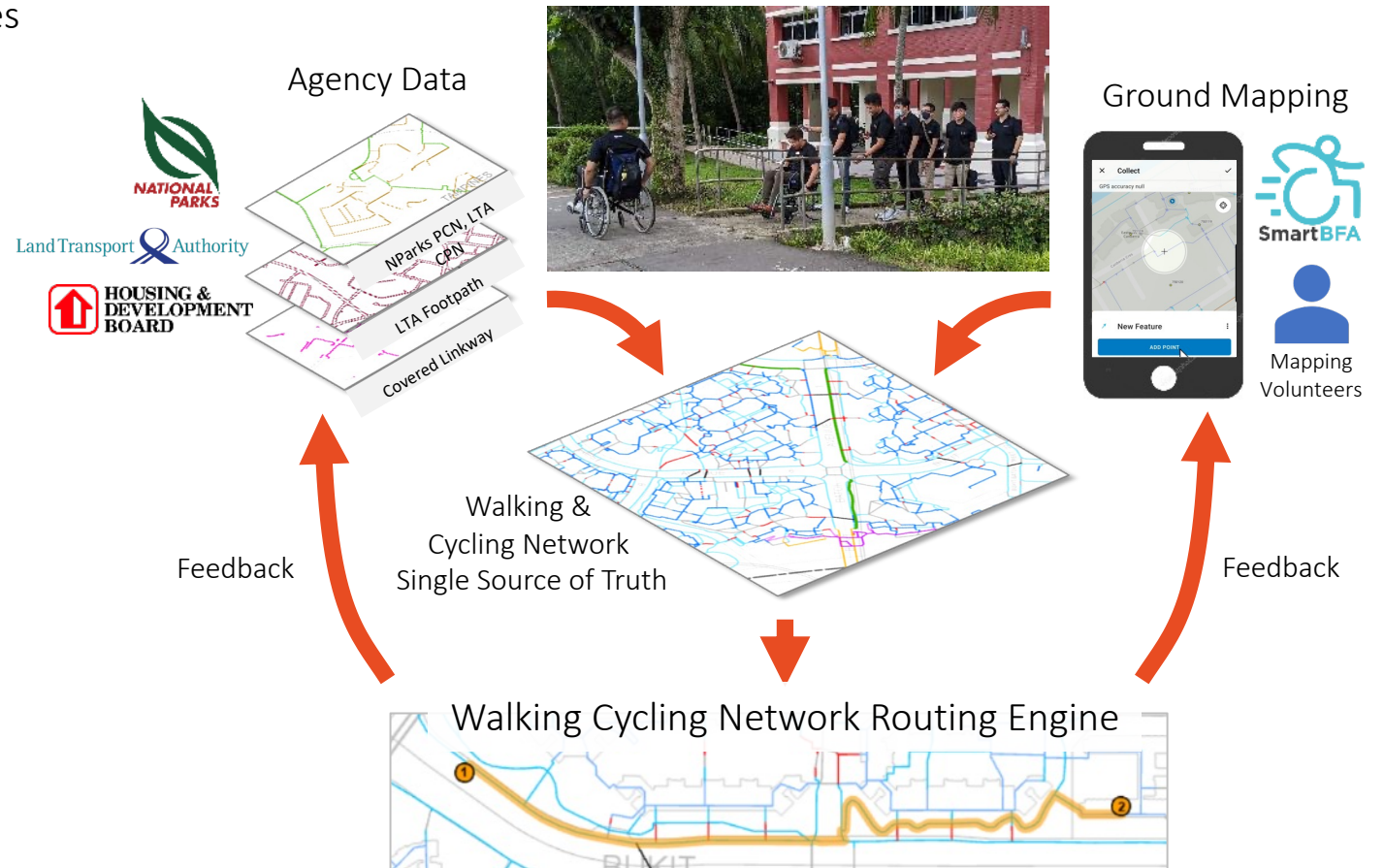
Improving the accuracy of our understanding of accessibility between homes and amenities

Example of discrepancy between straight-line Euclidean buffer (in blue) and walkability buffer (in green)



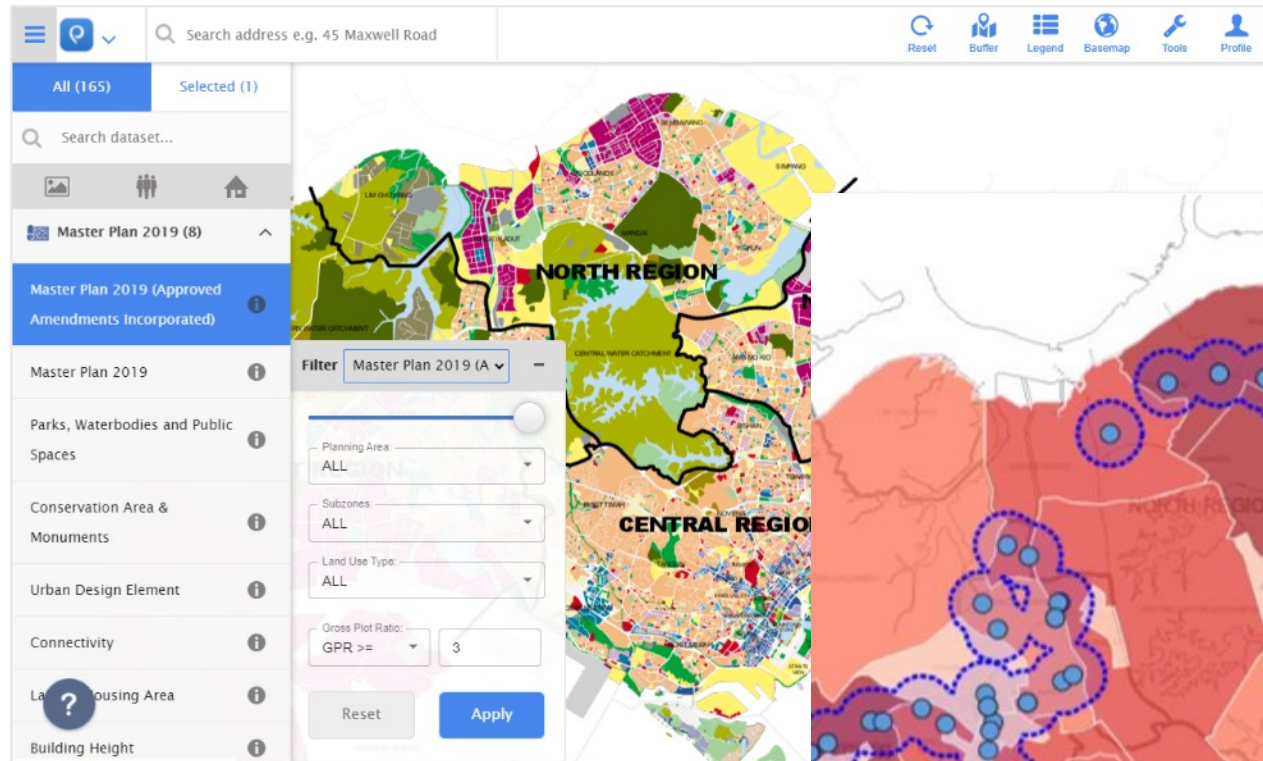
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Mapping Singapore's Walking and Cycling Network with our collaborators



USING DEMOGRAPHICS TO BETTER INFORM FACILITIES PLANNING

Identifying facility provision gaps due to accessibility or capacity issues



Layer Results Area DNA

Facility 1 record(s) found

Gap analysis based on population

ISLANDWIDE

Site Name	Demand		Supply		Total
	Existing Capacity	Pipeline Capacity	Planned Capacity		
TOWN A	200	100	5		305
TOWN B	100	100	100		300
TOWN C	20	50	70		140

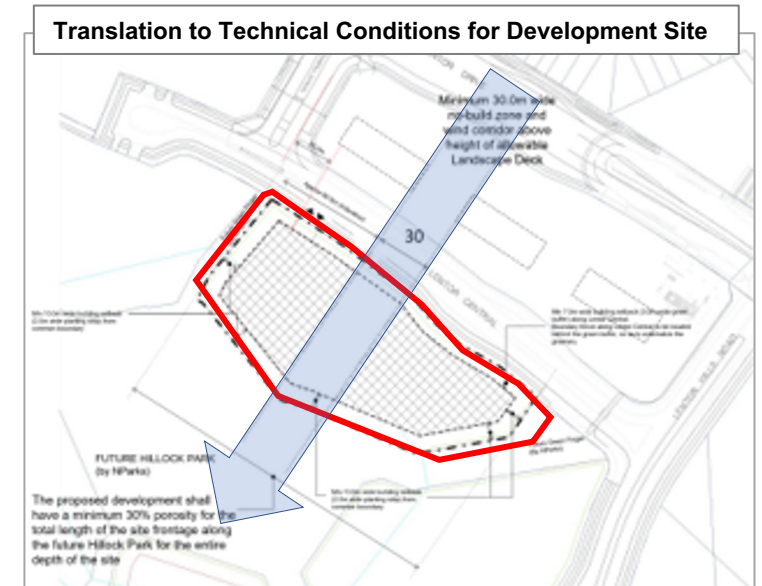
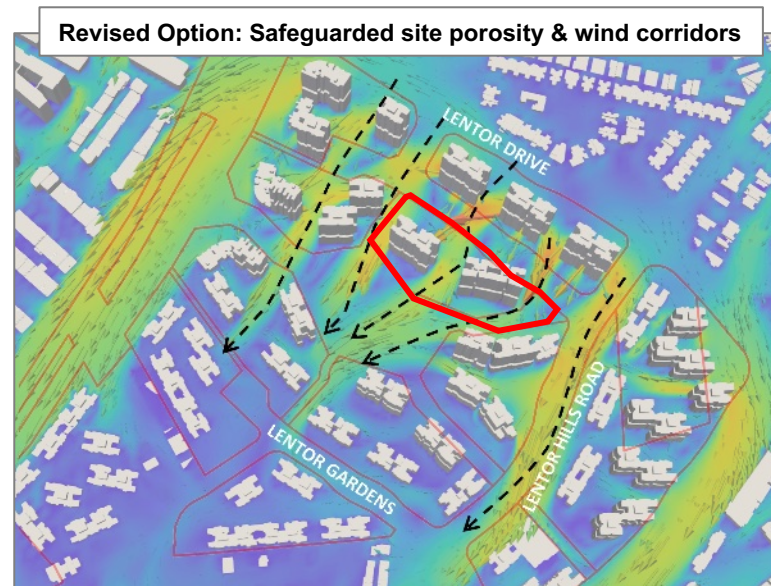
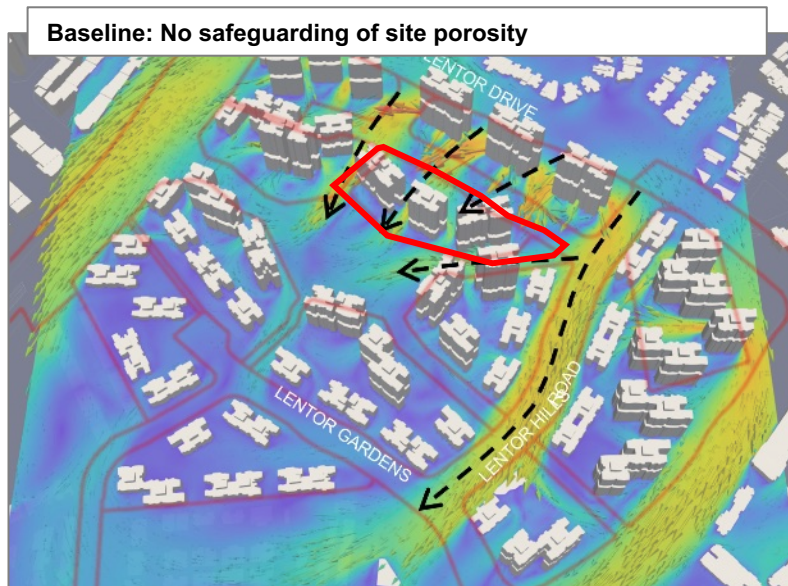
ePlanner: a GIS portal enabling quick visualisation & analysis of planning data

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USING SIMULATIONS TO DESIGN FOR COOLER ENVIRONMENTS

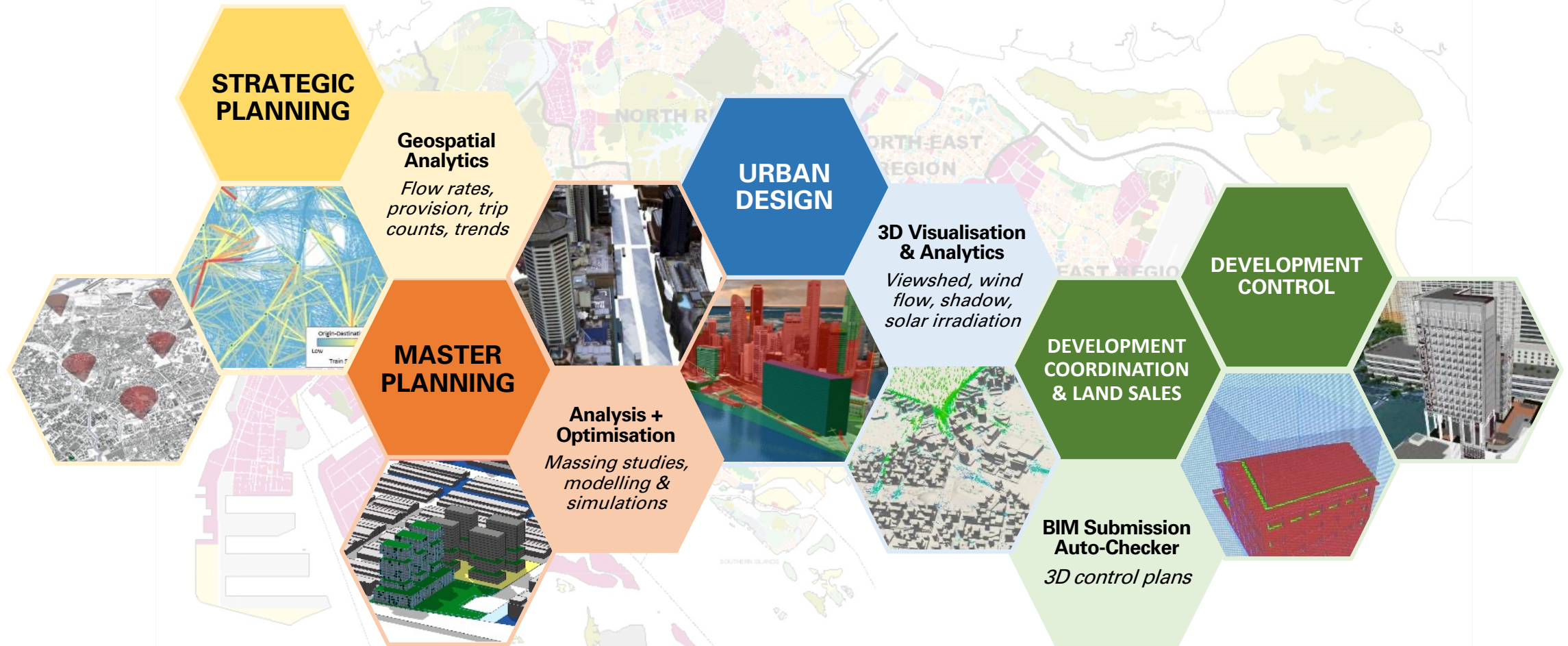
Wind flow study at Lentor Hills Estate

- To study effects of site porosity and optimise wind corridors through the parcels
- Findings were then translated into urban design guidelines and Technical Conditions of Tender (TCOT) for land sales sites



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INTEGRATING DIGITAL TOOLS THROUGHOUT THE PLANNING FRAMEWORK



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HARNESSING TECHNOLOGY TO PLAN THE FUTURE OF THE JURONG LAKE DISTRICT



Jurong Lake District

The largest mixed-use business district outside of the city, with quality offices, housing, amenities and green spaces

Key Sustainability Outcomes



Towards
Net Zero Emissions



Towards
Zero Waste



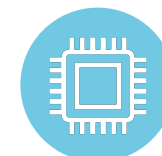
Pursuing
Sustainable Transport



Enabling
Healthy Living



Building a
City in Nature



Advancing
Sustainability
through **Partnership and Technology**

INTEGRATED INFRASTRUCTURE AT THE DISTRICT SCALE IN JURONG LAKE DISTRICT

Integrated Infrastructure and Facilities

- District cooling
- District pneumatic waste conveyance system
- Common services tunnel
- Solar panel deployment
- Smart electrical meters

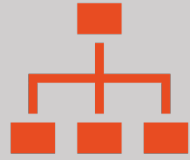
Green Mobility

- 4 MRT(*metro*) Lines by 2030s
- Public transit priority corridors
- Comprehensive cycling network
- Pedestrian friendly streets
- Interconnected basement carparks
- Significant reduction in car parking

Autonomous Vehicle & Electric Vehicle ready

- Charging provisions for EV fleet
- Autonomous vehicles for both people and goods





Data as a foundation

Accurate
Reliable
Consistent



Relevant Insights

Applicable
Inter-operable
Impactful



A lively community

Open
Collaborative
Extensible

TOGETHER, WE CAN **ENABLE EACH OTHER
WITH TOOLS AND EXPERTISE FOR
A MORE SUSTAINABLE & RESILIENT FUTURE**