



ASEAN  
AUSTRALIA  
SMART CITIES  
TRUST FUND  
Asian Development Bank



Australian Government  
Department of Foreign Affairs and Trade



Implementation Partner:



Photo: Adobe Stock.

# PENANG

Envisioning a smart livable urban center with seamless mobility and access to basic services through a transport micro-simulation model

Penang, the thriving arts and culture hub of Malaysia, is aspiring to become a vibrant smart state by 2030. With the Penang Smart Mobility Micro-Simulation Model Development project, the city council will be able to assess the potential impacts of developer plans and transport interventions so as to protect its historic center, ensure inclusive mobility, and cultivate a strong sense of place.

## CONTEXT AND STRATEGIC ISSUES

The development of Penang is driven largely by Penang 2030, an institutional plan to achieve a “family-focused green and smart state that inspires the nation”. One of its four themes focuses on investing in the built environment to improve resilience, under which there are four strategic initiatives: (i) balance development through effective spatial planning, (ii) strengthen mobility, connectivity, and digital infrastructure, (iii) integrate municipal services with smart technologies, and (iv) implement climate change adaptation plans.

The [Penang Smart Mobility Micro-Simulation Model Development](#) project of the ASEAN Australia Smart Cities Trust Fund (AASCTF) contributes to all these four initiatives, particularly via the second. The project was borne out of the need to manage growth and reduce congestion in Penang, especially in George Town, the state capital with an urban core that is recognized as a UNESCO World Heritage Site. Existing studies, such as the Penang Transport Masterplan 2030 and the Penang Green Transport Plan, helped inform the project’s development and implementation.

## CONTRIBUTIONS TO THE SUSTAINABLE DEVELOPMENT GOALS



**Ensure healthy lives and promote well-being for all at all ages** – The micro-simulation model can enable authorities to review traffic management scenarios that can help lessen road traffic accidents and improve road safety for all, especially vulnerable groups.



**Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation** – By using the model, Penang will be able to implement transport plans proposed in existing studies and build transport-related infrastructure that advances the Penang 2030 agenda.



**Make cities and human settlements inclusive, safe, resilient, and sustainable** – The model can be a key tool to design better urban spaces, prioritizing people, preserving culture, and protecting nature.



**Take urgent action to combat climate change and its impacts** – Scenarios tested in the development of the micro-simulation model include active mobility and public transport interventions, which can reduce dependency on private vehicles and minimize carbon emissions.

## CREATING A MICRO-SIMULATION MODEL IN TWO STAGES

AASCTF collaborated closely with the City Council of Penang Island (MBPP) and Digital Penang (the state's digitalization agency) to develop a micro-simulation model in two stages. First, a [model](#) was piloted for a small area in George Town to demonstrate proof of concept and the benefits for master planning and evaluating transport solutions. Second, the [model](#) was expanded to cover the full UNESCO heritage site.

In both stages there are four main steps: data collection, model development, model calibration, and scenario testing. Crucial to this simulation process was gathering the capacity, demand, and GPS (global positioning system) data, as well as calibrating the model to get accurate results. Under Stage 2, additional traffic surveys were conducted to account for possible deviation in traffic volume right after the COVID-19 movement restrictions, which is when Stage 1 traffic surveys were conducted. With this greater breadth, the model was used to [test scenarios](#) on improving traffic management and public transport, providing priority pedestrian and cycling corridors in the core area of George Town, and removing on-street parking in certain areas of the city. Results from the testing will enable recommended changes for Penang's Traffic Impact Assessment guidelines and other policies.

## RAISING LOCAL CAPACITY TO ENSURE SUSTAINABILITY

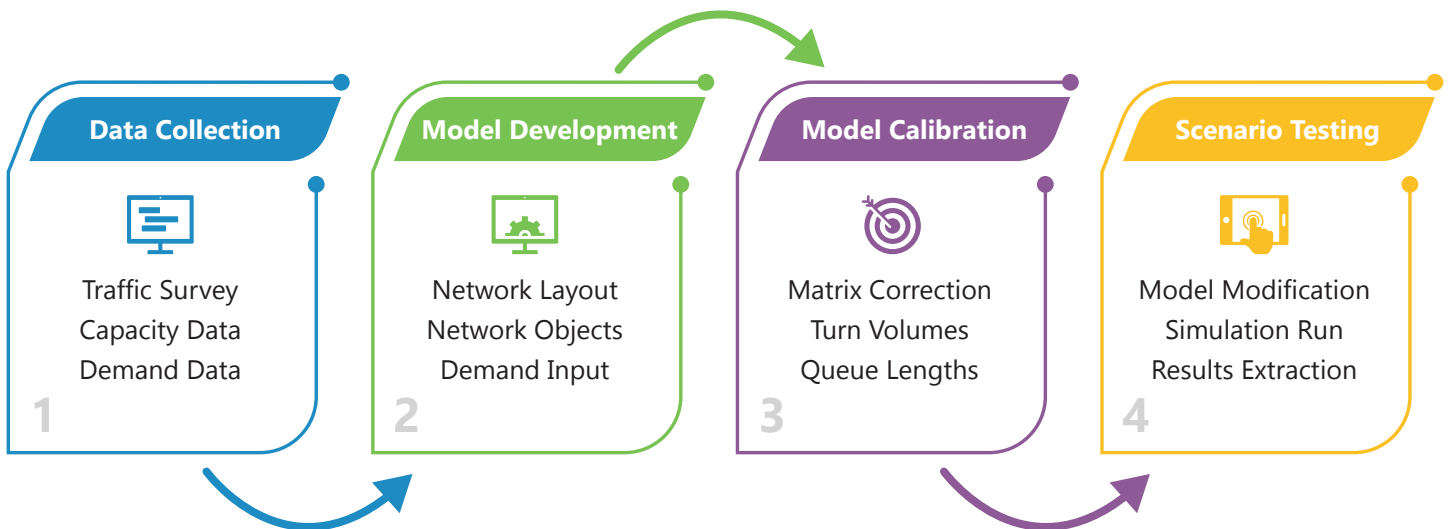
To strengthen ownership and encourage long-term use of the model, the project also includes the purchase of the PTV Vissim software license for MBPP and a superuser training for selected local staff.

The training is an accredited course from PTV Vissim, which covers the basics of microscopic traffic modelling and mesoscopic simulation and dynamic assignment for modelling larger networks. By building capacity, these new superusers can then share their knowledge with peers and colleagues. This will not only help with analyzing transport strategies and solutions, but it will also enable MBPP to present such issues and impacts with other stakeholders and the public for a more open and participatory urban governance.



The micro-simulation model enables the government to present proposed changes to the public so they can visualize the impact on daily living, such as timed pedestrian crossings (symbolized with the green and red blocks).

## SIMULATION STUDY WORKFLOW



## ABOUT THE ASEAN AUSTRALIA SMART CITIES TRUST FUND

The ASEAN Australia Smart Cities Trust Fund (AASCTF) assists ASEAN cities in enhancing their planning systems, service delivery, and financial management by developing and testing appropriate digital urban solutions and systems. By working with cities, AASCTF facilitates their transformation to become more livable, resilient, and inclusive, while in the process identifying scalable best and next practices to be replicated across cities in Asia and the Pacific. The Trust Fund is supported by the Australian Government through the Department of Foreign Affairs and Trade (DFAT), managed by the Asian Development Bank (ADB) and implemented by Ramboll.