

# IGES High Level Talks

Towards Smart Zero Carbon and Climate Resilient Cities in Malaysia and Japan

**PENANG 2030**

*A FAMILY-FOCUSED GREEN AND SMART STATE  
THAT INSPIRES THE NATION*



# Location of Penang



# PENANG BASIC PROFILE

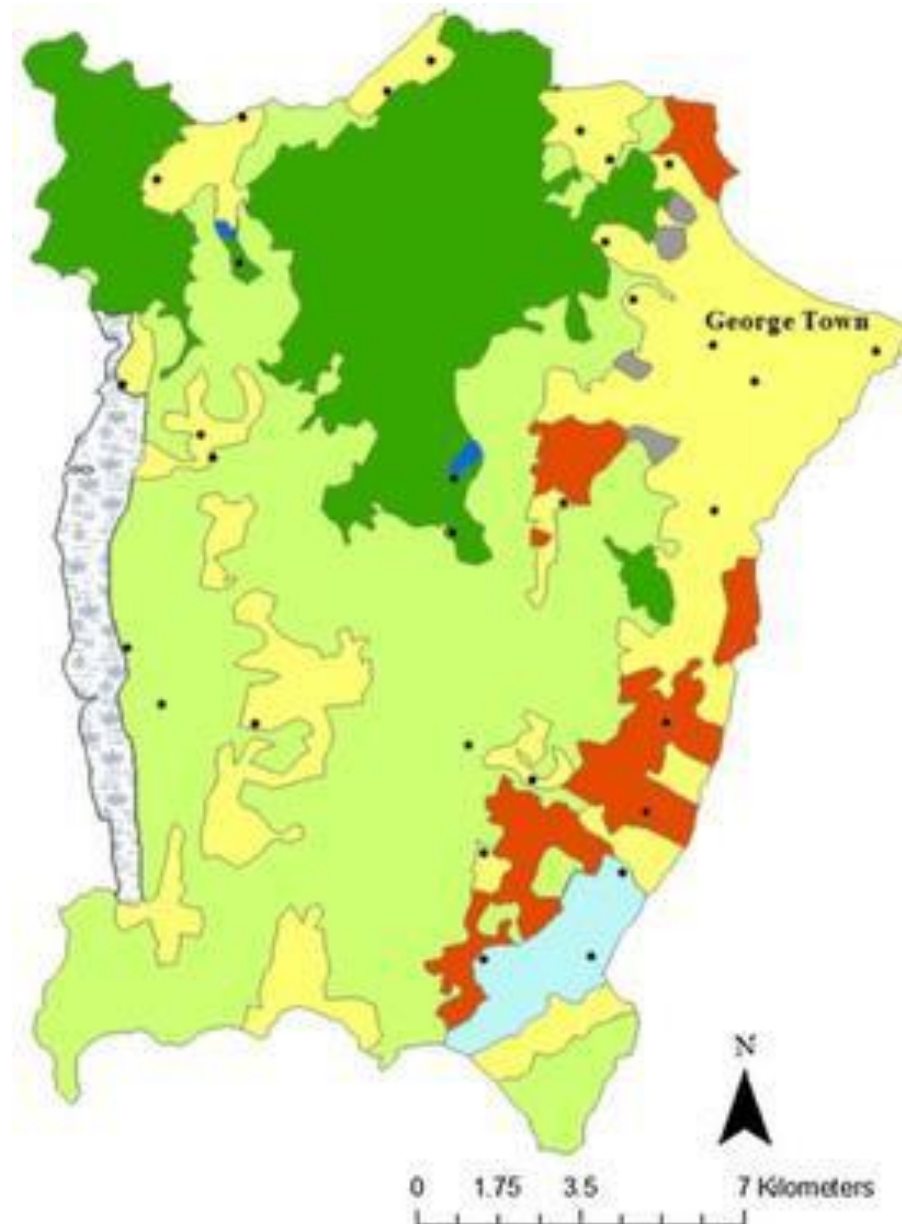


	Area (Hectare)
Northeast Penang Island	12,761.89
Southwest Penang Island	18,006.37
North Seberang Perai	27,467.59
Central Seberang Perai	23,885.23
South Seberang Perai	24,637.11
Total	106,758.18

Source : PLANMalaysia@Pulau Pinang, 2019

Source : [www.visitselangor.com](http://www.visitselangor.com)

# PENANG ISLAND



***303 square kilometers  
792,000 population***

***61.84% of Penang Island covered with  
natural/ green areas***

***Land above 75 meters (250 feet) from sea  
level is maintained as natural/ green area  
-restricted development***

***No development is allowed on slopes above  
25 degrees***



# GEORGE TOWN UNESCO WORLD HERITAGE SITE

The inscription of George Town as a **UNESCO World Heritage Site on 7 July 2008** was based on the Outstanding Universal Value of cultural diversity embodied and embedded in the living heritage and built heritage



LIVE - LEARN AND WORK IN GEORGE TOWN

One Of Asia's Most Beautiful UNESCO  
World Heritage Sites - Times of India 2021

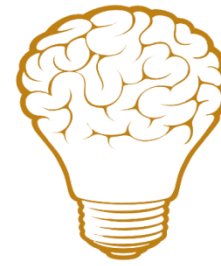
**Core Zone: 109.38 hectares**

**Buffer Zone: 150.04 hectares**





cleaner  
greener  
safer  
healthier  
happier



Intelligent  
City



Liveable  
City



Happy  
City



SUSTAINABLE  
DEVELOPMENT GOALS







# Penang Green Council (established in 2011)

## VISION

PGC as a central hub harnessing green technology and supporting holistic Green initiatives to achieve sustainable and resilient Penang

## MISSION

To enable, empower and enrich all stakeholders to practice sustainable development that protects the environment and quality of life

- AIMS of PGA
- Provide a framework for sustainable future growth in Penang
- **Help prioritisation** of policy options that will catalyse real changes on the ground
- Provide a **roadmap for Penang** to achieve its Sustainable Development Goals (SDGs)
- Establish a **forward-looking approach** to development and planning in Penang



# Penang Green Agenda 2030



## 10 Working Group

The working groups:

1. Land Use and Planning,
2. Disaster Risk Reduction and Management,
3. Green Economy,
4. Agriculture,
5. Marine and Coastal Management, Sustainable Mobility and Connectivity
6. Green Building and Township,
7. Water and Sanitation,
8. Governance and Institutions
9. Biodiversity; and
10. Natural Ecosystem

**Engages all stakeholders and Penangites to identify and combat the current and future environmental challenges of the state, proposing feasible solutions.**



# GREEN INDUSTRY

## Manufacturing Sector in Penang:

- **E&E Hub**
- **More than 300 MNCs and is home to 3000 SMEs supporting the semiconductor supply chain.**
- **Contributes to approximately 8% of the global back-end semiconductor output.**
- **Mid to lower end of value chain**

## **Circular Economy and Industry:** **Platform for Partnerships and Capacity Development**

### Objectives

- Reduce environmental impacts of production and consumption
- Improve productivity, environmental performance and competitiveness (incl. ESG)
- Transform Penang into a Green Industrial Hub.

### Strategies

- Platform Establishment
- Partnership Programme
- Supporting Programme



# Road to

# LCC @ MBPP

## Low Carbon City Roadmap





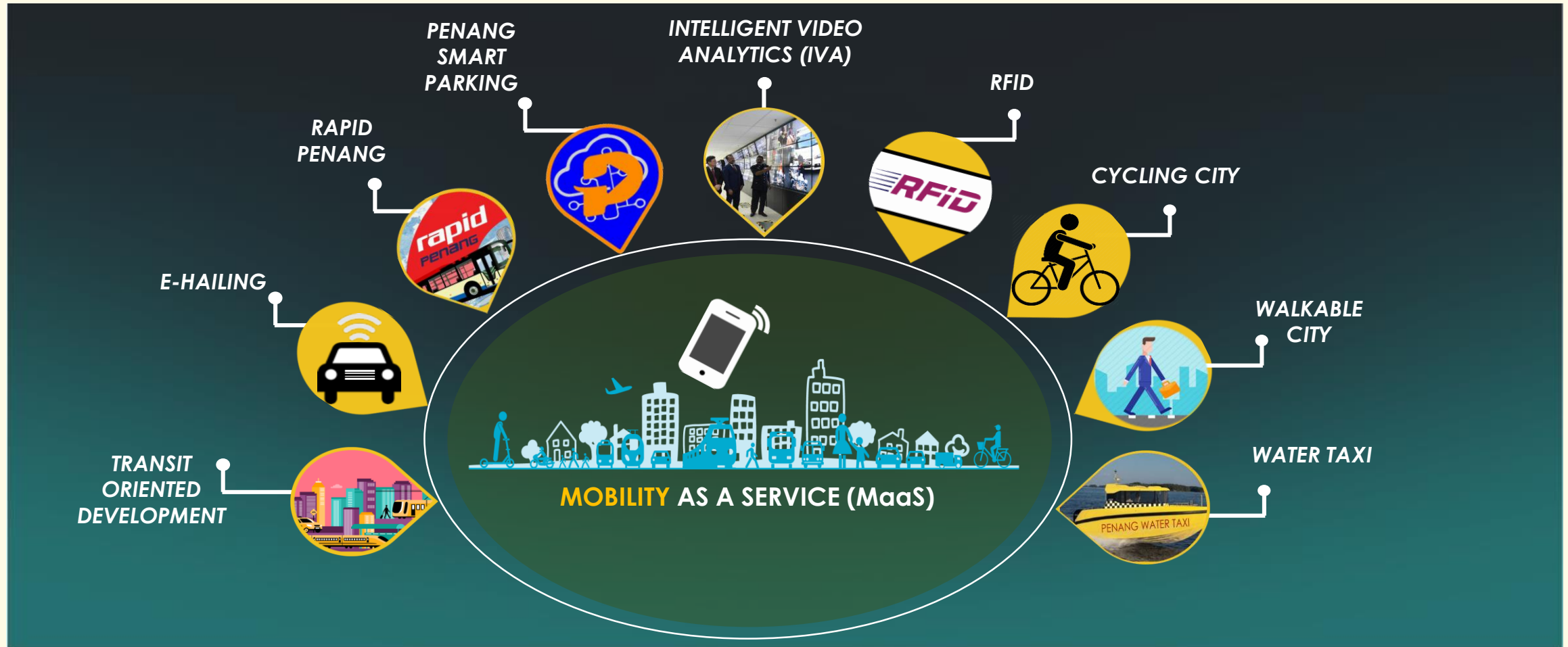
# **PUBLIC BUS AND FERRY SERVICES PROVIDED **FREE** TO CITIZENS**

## **Funded by the State Government and City Council of Penang Island**



**RM11.4 million (USD3 million)  
allocated in 2023**

# Mobility as a Service



This is an integrated public and private transport system that focuses on smart mobility and reduces the use of private motorised vehicles





# Spiral bridge

Opening May 2018

Harnessing solar power



The spiral bridge along with two other bridges across Sungai Nibong Kecil and Sungai Ara including 1.5 km of cycle lanes were built at a cost of RM8.9 million.





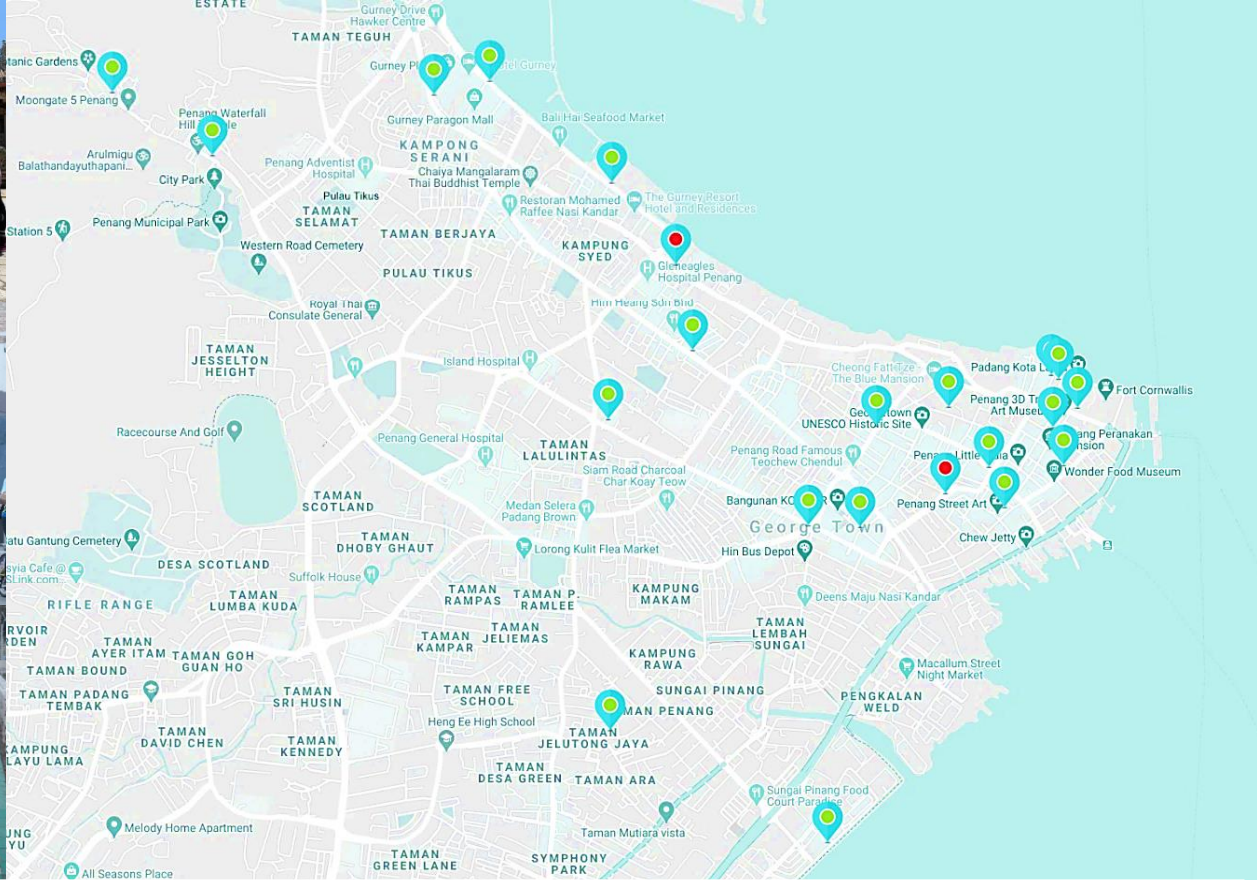
## BIKE ON FRIDAY (BOF)

Introduced in March 2015

Aiming to promote and encourage the **usage of the dedicated bicycle lanes** and to promote the idea of **cycling to work on Friday**, which is usually a heavy-traffic day.







## BICYCLE SHARING SYSTEM

The Bike Sharing System was launched in 2016 by MBPP to encourage cycling for work and leisure/recreation, to serve as a short distance transit vehicle and to reduce the usage of motor vehicles; for the general public and tourists.



Currently, there are 250 LinkBike bicycles and 29 stations throughout Penang Island, which includes George Town World Heritage Site.





# Penang's GREEN Initiatives

## PLASTIC USAGE CONTROL

2009

No Free Plastic Bag Day  
Every Monday

2011

Everyday is No Free Plastic  
Bag Day

2012

Ban on polystyrene food  
containers  
(Educational phase started  
from 2009)

2016

Waste Segregation at  
Source Policy

2018

- 'No Single Use Plastic' campaign
- Launching of Penang 2030

2019

- 'No Plastic Straw' campaign
- 'No Plastic Bag Day Every Monday'

2020

- No Plastic Bag Day Every Mon - Wed
- Seberang Perai Circular Economy Roadmap

2021

- No Plastic Bag Day Every Mon - Wed and RM1 charge on Thurs - Sun
- Launching of Penang Green Agenda
- Penang Waste Management Roadmap 2030





# GREENHOUSE GAS

## CARBON SINK

We can't stop **Urbanisation**, but we can go for



Green  
Buildings



Low Carbon  
City



Net Zero  
Buildings



UTM  
UNIVERSITI TEKNOLOGI MALAYSIA



# PENANG CARBON NEUTRAL 2050

CITY COUNCIL OF PENANG ISLAND ROAD MAP

**CLIMATE ACTION PATHWAYS**

IN COLLABORATION WITH UNIVERSITY SCIENCE MALAYSIA  
GUIDED BY PROF. HO CHIN SIONG



Photo credit : behance.net





# EVERYONE'S RESPONSIBILITY

1. INSTIL/ INCULCATE ENVIRONMENTAL RESPONSIBILITY (PRE-SCHOOL/ SCHOOL/ INSTITUTIONS)
2. PUBLIC ENGAGEMENT/ PARTICIPATION/ EMPOWERMENT
3. ENFORCEMENT



# PROGRAMS AND CAMPAIGNS

– 5R (Refuse, reduce, reuse, repurpose and recycle)



PENANG  
2030



1

## “SAY NO TO PLASTIC STRAWS & SINGLE-USE PLASTICS” CAMPAIGN

Shopping Complexes, F and B outlets, hawker centres and commercial premises along the coast



2

## EDUCATION AND RECYCLING PROGRAMS

Started in 2011, involving pre-school, primary schools and secondary schools



3

## BRING YOUR OWN BAG/CONTAINER CAMPAIGNS (BYOB/BYOC) ‘





## WATER SAVING DEVICES

Penang also adopts 'water demand management'- through mandatory installation of water saving devices in new development projects, **the first state in Malaysia to require water saving devices (tap fittings, shower fittings, toilet cisterns and urinals), to be installed in all new projects.**





## **RAINWATER HARVESTING**

Penang has implemented the Requirements of Rainwater Collection And Utilisation System (SPAHS) pursuant to By-Laws 115



# **RETROFIT ENERGY MANAGEMENT SCHEME (REMS) FOR STREET LIGHTING IN PENANG ISLAND**



- 1. City Council of Penang Island has changed all 33,000 units of street lighting within Penang Island.**
- 2. The project cost is mostly funded by the cost savings from monthly electricity bills charges.**
- 3. Target Outcome:**
  - I. Save RM6.0 million per year.**
  - II. Reduction of Carbon Footprint (9 kilo tons Co2 per year).**



# Retrofit Energy Management Scheme (REMS) of Solar Installation for City Council of Penang Island

## Retrofit Energy Management Scheme (REMS) of Solar Installation for City Council of Penang Island

City Council of Penang Island is in the progress of installing solar system on the selected premises rooftop.

The project is using zero Capex whereby City Council of Penang Island will pay directly the electricity bill to the solar energy provider. Save RM320,000.00 per year.

Reduction of Carbon Footprint is expected to be around 758,642 kg CO<sub>2</sub> per year





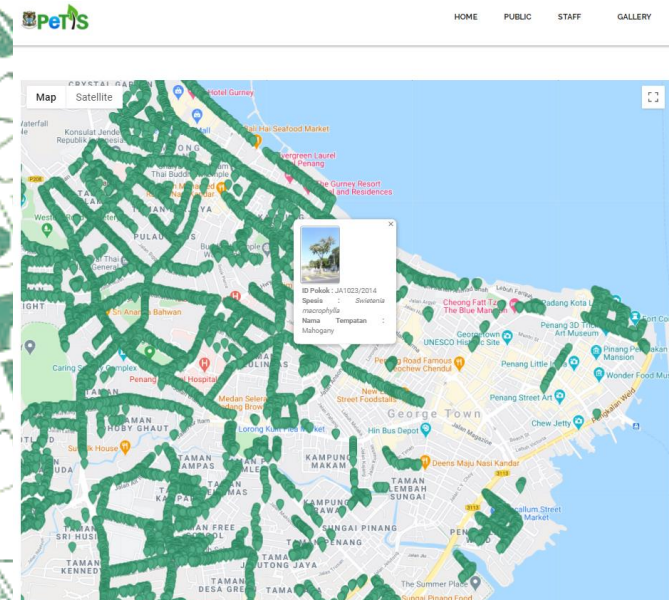


# TREE PLANTING AND MAINTENANCE

**100,00 trees planted in the last 5 years**



In managing and maintaining trees effectively landscaping, landscape managers need to have accurate and current information about trees or groups of trees to be managed. Information such as tree species, number of trees, the location and position of trees, tree size, tree current health status and maintenance requirements for each tree are constantly





HOME / **MALAYSIA**

# Dramatic warming projected in world's major cities, including KL, by 2050

Published 1 week ago on 11 July 2019



Scientists have predicted the likes of Kuala Lumpur, Jakarta, and Singapore will experience unprecedented climate conditions by 2050. — AFP pic

*“Climate change is the biggest threat the world faces and we must act now”.*

UN Secretary general Antonio Guterres  
2018



# MITIGATION AND ADAPTATION PROJECTS

**Southeast Asia is one of three regions in the world which will be hardest hit by climate change in the near future.**

***Special Report on Global Warming of 1.5 ° C, IPCC, October 8<sup>th</sup>, 2018***

Malaysia's urban areas were not at risk from heat stress in 2000 but will be in 2050.

*Impact 2050 – The Future of Cities, Technical report, UCCRN, 2018*

**More extreme weather events**



**Flooding**

Damage to infrastructure and private property



**Heat waves**

Negative impact in human and ecosystem health

Agriculture production losses

**Rise of temperatures**



**Impact on health**

Less livability conditions



**Increased costs**

Increased costs of food

Increased energetic costs

# INTELLIGENT OPERATIONS CENTER (IOC)



1045 cameras installed to date  
with analytical features

Traffic monitoring, flood  
monitoring, slope monitoring,  
illegal dumping, covert operation

Enforcement and public warning  
system







# SmiDaT Smart Island Digital Twin



## Digital Infrastructure

Robust and Green Data Centre  
Gigabit City  
Seamless and Secured Council Network  
Hyperconverged Compute Engine  
Low-Powered Wide Area Network (LPWAN)



## Council Operating Systems

Virtual island of Penang (ViP)  
Integrated Local Council Solutions (ILCS)  
Big Data Analytics and Smart Dashboard  
uAssessment



## Council Enterprise Systems

Enterprise Supports Systems  
Integrated Enterprise Solutions  
Enterprise Collaborative Workspace  
Operational Excellence



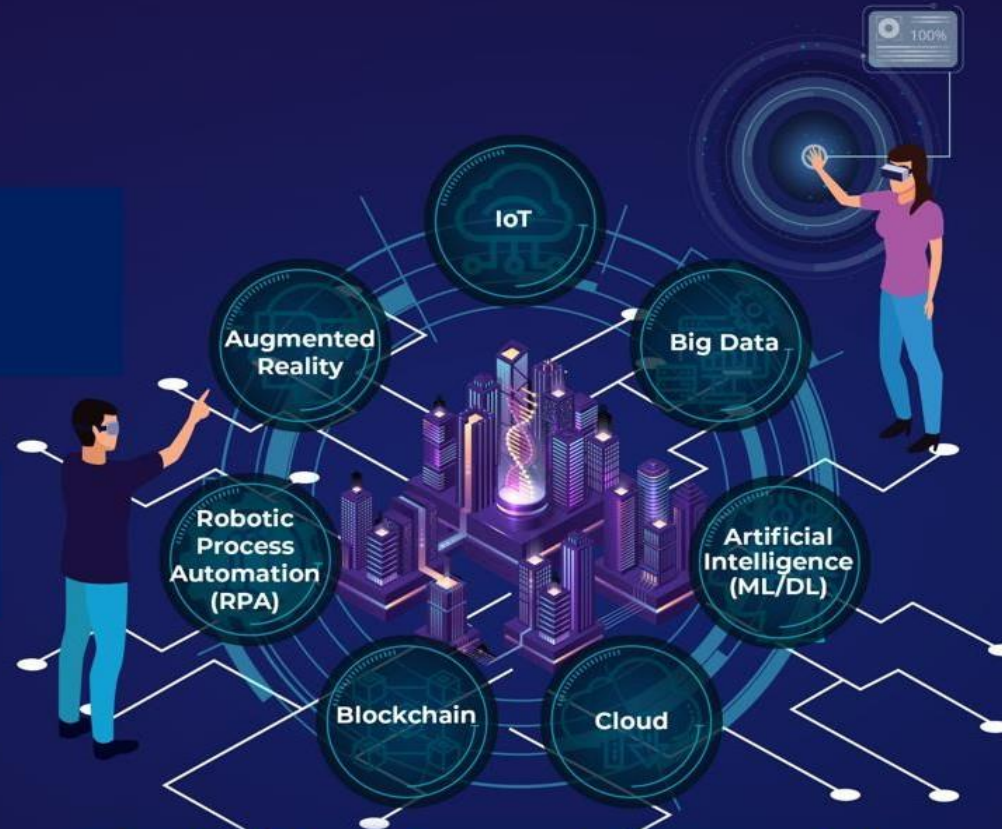
## Business and Citizen Engagement Systems

SmartMBPP (Pearl)  
uLesen  
jbo@mbpp  
eAduan  
eTempahan  
MBPP Portal  
Citizen Relationship Management



## Smart City Solutions

Intelligent Operations Centre (IOC)  
Smart Surveillance and Analytics  
Intelligent Traffic Systems (ITS)  
Penang Smart Parking (PSP)  
Low Carbon City Framework (LCCF)  
Green Building Index (GBI)  
Universal Design (UD)  
Green Connectivity  
Resources Conservation and Renewable Energy  
Climate Resilience and Disaster Management  
Circular Economy  
Landfill Diversion (MRF, WTE, C&D)  
MakerSpace



## Digitalization of Everything





## GIGABIT CITY (PiNet) DIGITAL SUPERHIGHWAY

- Improve the performance of MBPP's CCTV system which currently using radio wireless network
  - \* Phase 1 completed: 40% of CCTV will use this fiber optic network to transmit video data to IOC MBPP
  - \* When overall completed (4 phases): at least 80% of CCTV will be connected
- Improve the efficiency of video analytics program in Intelligent Operation Center (IOC)
- Internet of Things (IOT) – Penang Smart Parking (PSP), traffic lights, street lights, sensors etc.
- Inter-connectivity network among all MBPP's premises & assets
- Seamless access by all MBPP's staffs & public
- Digital inclusivity
- Saving : RM 5.11m

25%

PROGRESS

40%

PROGRESS

## VIRTUAL ISLAND OF PENANG (VIP)

A geohub with virtual replica of a city to simulate, analyze and optimize its infrastructure, services & operations

- Phase 1 : Building the Infrastructure, Workflows and Framework Foundation
  - i. Platform Upgrade
  - ii. Geohub Development & Data Migration
  - iii. Critical Integration
- Phase 2 : Driving Digital Transformation of City Operations
  - i. 3D, IoT and Artificial Intelligence
  - ii. Heritage Conservation, Traffic, Flood and Low Carbon
- Phase 3 : Driving Digital Transformation with Smart Initiatives and Services
- Phase 4 : Interconnecting Local Government and Citizens with Public Engagement Hub



## SmIDaT Smart Island Digital Twin

*Digitalisation of Everything*

100%

PROGRESS

## ULESEN UBIQUITOUS LICENSE

- Highly Secured Digital License
- Fast Approval Process based on the Pre-Approval Concept
- Hyper integration (Internal and external touch-points)
- Highly Configurable - Support Dynamic Configuration
- Zero Face to Face
- Saving : RM65k yearly (printing, paper, sticker, ink)

## ROBUST & GREEN DATA CENTER PUSAT DATA SEKTOR AWAM (PDSA)

- Saving : Capex RM2.55m + Opex RM500k (yearly maintenance)
- Fault Tolerant Tier-4 Facility
- Green technology adoption
- Saving from future migration and cloud adoption
- Saving from future DRC setup
- Saving from utility bills
- Operation Level Understanding MyGovCloud@PDSA between MAMPU & MBPP signed on 07.02.2022

50%

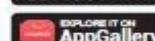
PROGRESS

80%

PROGRESS

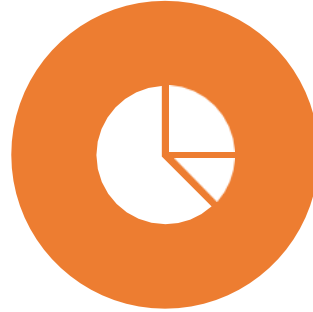
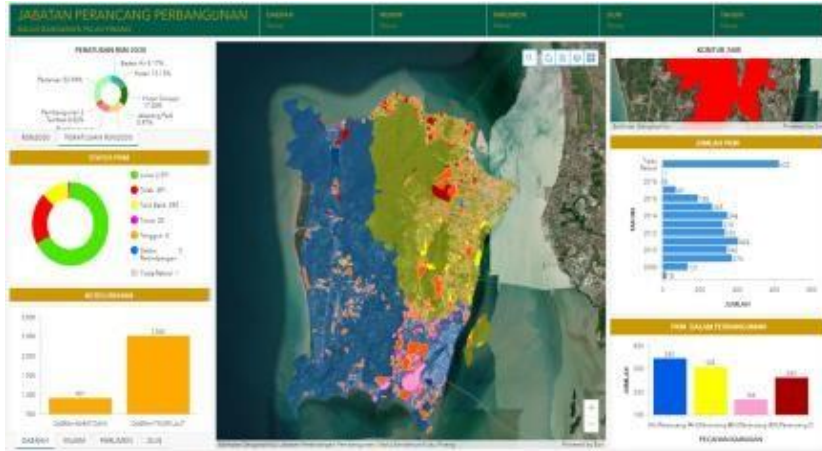
## PEARL One Touch Penang

- A Single Window To Access All Public Services And Relevant Private Services for Residents, Visitors, Businesses, Investors, And More
- More than 110 MBPP services over 12 categories
- Multi channel payment
- Enhanced public experience
- Support local economy and entrepreneurs
- Advanced Security Measures
- Bank Negara Malaysia APPROVED E-Wallet
- A Future Ready App comes with eWallet and Powerful End To End Solutions To Benefit Every Stakeholder
- Go live starting 23rd March 2023





# Virtual Island of Penang (ViP)



## KEY DELIVERABLES

- Phase 1 – Building The Infrastructure, Workflows and Framework Foundation
- Phase 2 – Driving Digital Transformation of City Operations
- Phase 3 – Driving Digital Innovation with Smart Initiatives and Services
- Phase 4 – Interconnecting Local Government and Citizens with Public Engagement Hub



## IMPACT / BENEFIT

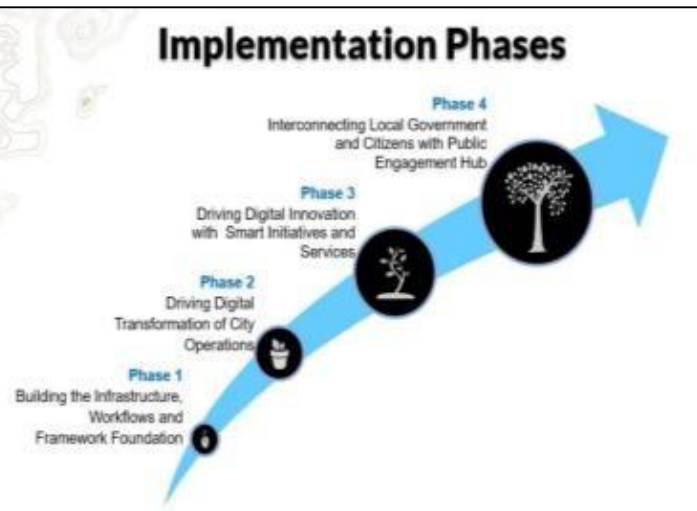
- Mapping and Visualization
- Data Management
- Field Mobility
- Monitoring and Assessment
- Data Analytic
- Decision Support
- Sharing and Collaboration
- Data monetization



## PROJECT MILESTONE

- **Current Status :**
- **Phase 1 : 95%**
- **Phase 2 : Tender Process**

## Implementation Phases



# OBSERVATION AND MONITORING WITH DRONES



SLOPE FAILURE Sungai Kelian, Jalan Lembah Permai, Tanjung Bunga, Pulau Pinang. (18 May 2018)

## DRONES



Slope failure Lebuhraya Berkembar, Jalan Paya Terubong, Pulau Pinang (18 October 2018)





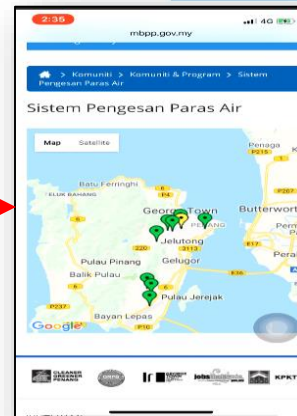
# WATER/ FLOOD LEVEL MONITORING- WATER LEVEL SENSORS

## SENSOR MENGESAN PARAS AIR DI LOKASI HOT SPOT



NO.	WATER SENSOR LOCATIONS
1.	Lebuh McNair / Lebuh Presgrave
2.	Lintang P. Ramlee / Jalan P. Ramlee
3.	Jalan Langkawi / Taman Rampas (Masjid Kebun Lama)
4.	Jalan Utama (Hospital Pulau Pinang)
5.	Jalan Ayer Itam (Masjid Negeri Pulau Pinang)
6.	Jalan Lumba Kuda
7.	Lebuhraya Thean Tek (All Season Mall)
8.	Jalan Tun Dr Awang (Hadapan Setia Spice Convention Centre)
9.	Jalan Mayang Pasir 2 (Hotel Seri Malaysia)
10.	Jalan Sultan Azlan Shah (Hadapan Clarion Sdn Bhd)

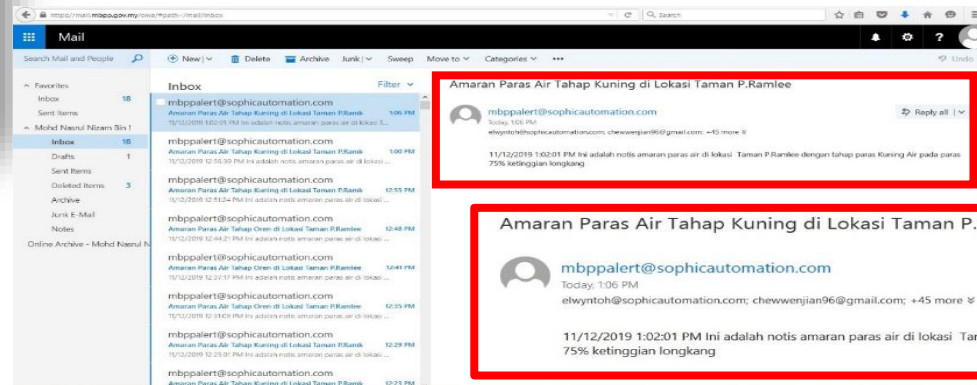
AMARAN DIHANTAR



TELEFON BIMBIT

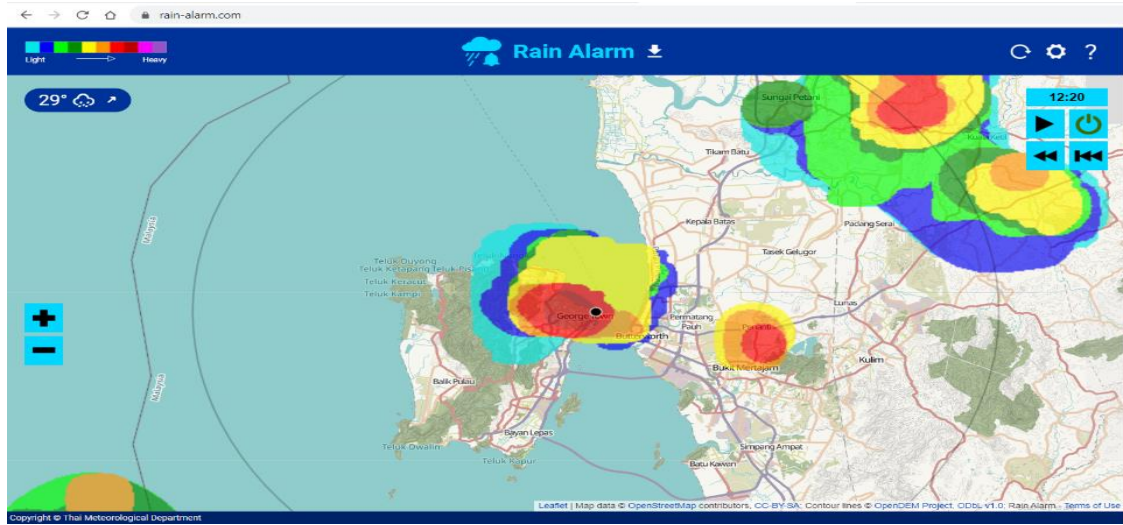


LANAM WEB MBPP

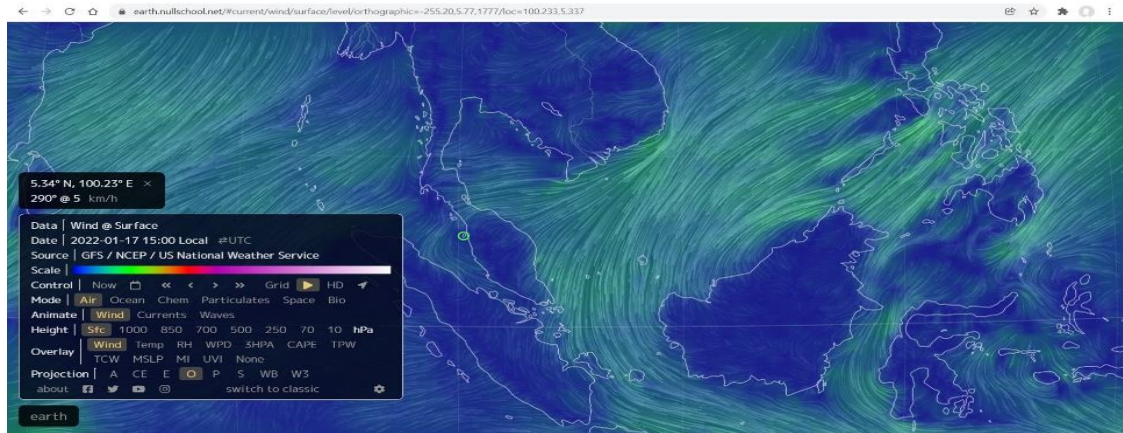


EMAIL PEGAWAI MBPP

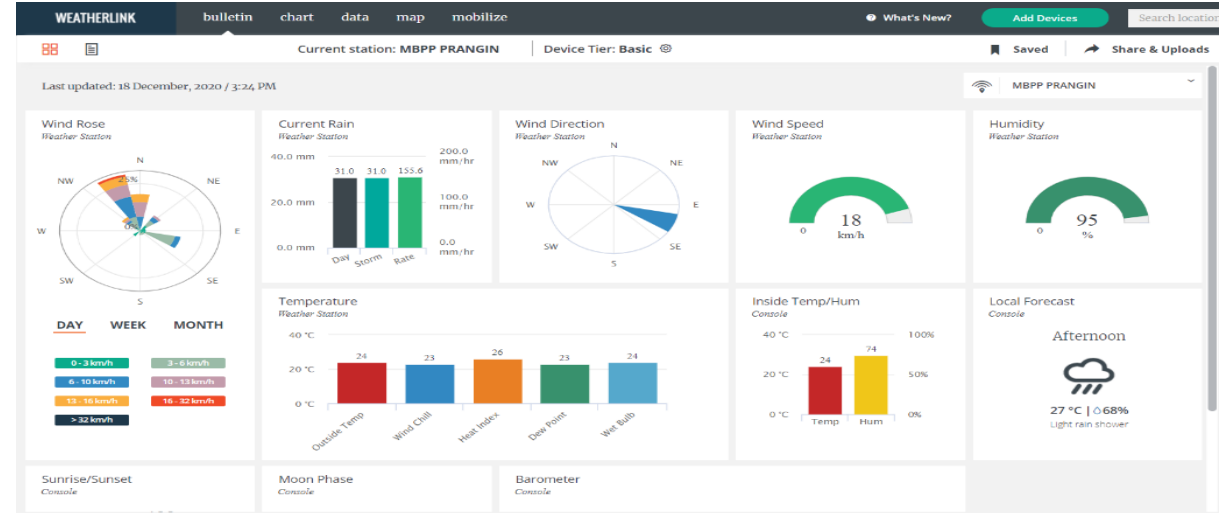
# CLIMATE CRISIS MANAGEMENT - OPEN SOURCE DATA



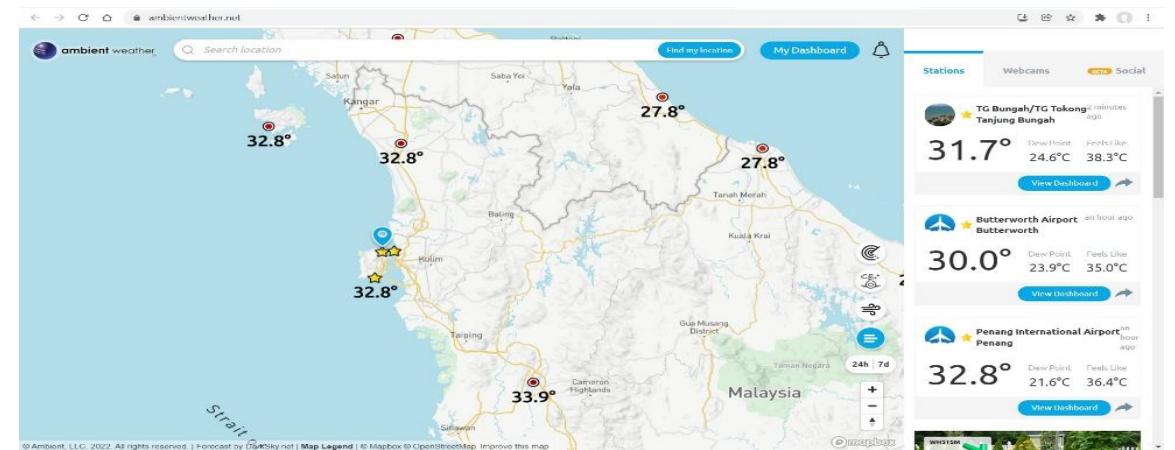
RAIN ALARM



EARTH NULLSCHOOL



WEATHERLINK



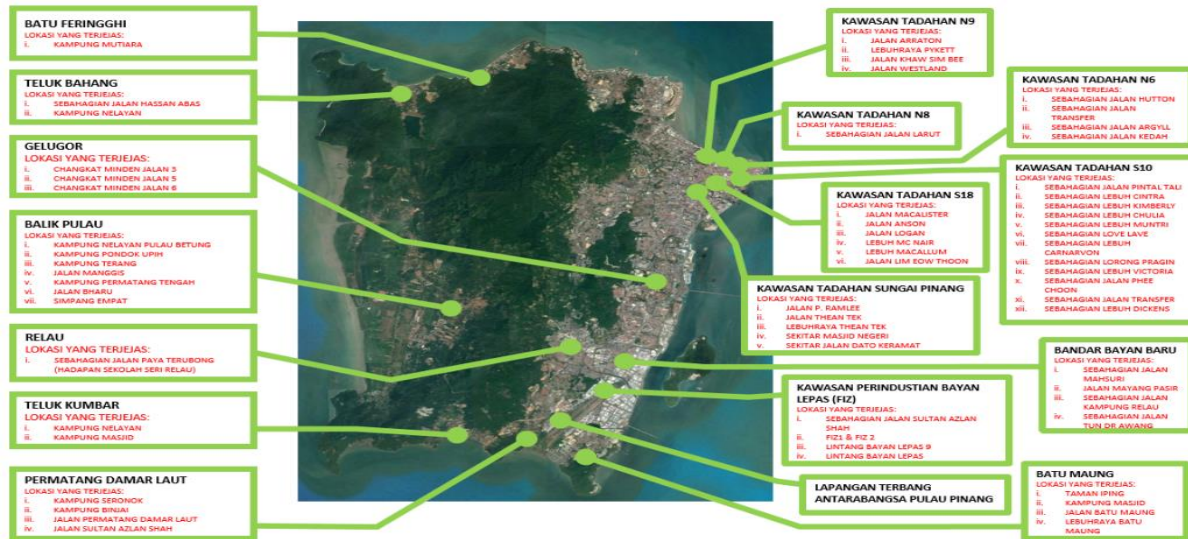
AMBIENT WEATHER

PENGUNAAN OPEN SOURCE DATA SELAIN DARIPADA DATA MET MALAYSIA DAN JPS UNTUK TUJUAN PEMANTAUAN, PERSEDIAAN DAN PELAPORAN BENCANA



# FLOODING AND SLOPE FAILURE HOTSPOTS

FLOOD HOT SPOTS



59 Locations

SLOPE FAILURE HOT SPOTS



33 Locations

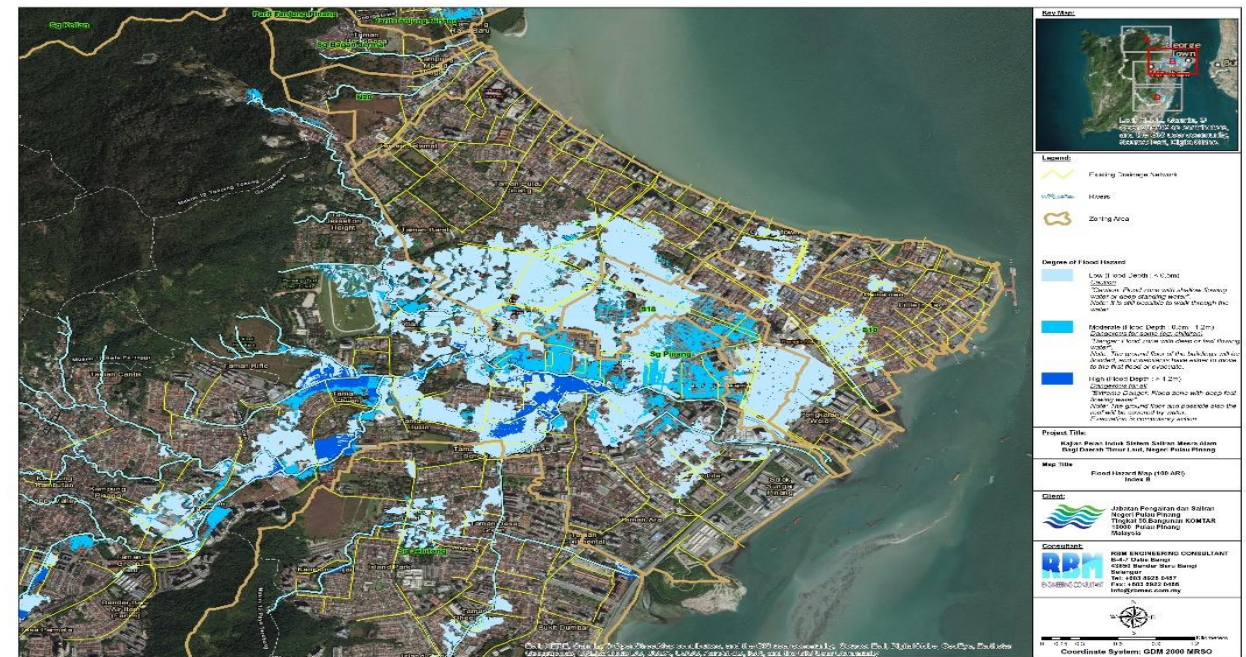
PENANG HIGH RISK LAND HOT SPOT MONITORING

No	Location	Risk	Mitigation
1	Lot 3121 & 3822, Puncak Bkt. Mutiara	High	Rectification Done
2	Lot 3673, Puncak Bkt. Mutiara	Moderate	Rectification Done
3	Lot 4207, Tanjung Bungah	High	Rectification Work
4	Lot 559, Batu Feringgi	High	Rectification Work
5	Jln Teluk Bahang – Batu Feringgi	-	Rectification Done
6	Km 54, Permatang Damar Laut	-	Rectification Done
7	TK, Kampung Permatang Damar Laut	Moderate	Rectification Done
8	Rizab Jalan, Telok Kumbar	High	Rectification Work
9	TK, Taman Brown	-	Rectification Work
10	Lot 247, Balik Pulau	-	Rectification Work
11	Lot 60 & 219, Balik Pulau	-	Rectification Work
12	Lot 650, Miami Green	Moderate-High	Rectification Work
13	Km1.4, Laluan P14,	Moderate-High	-
14	Km1.8, Laluan P14,	Moderate-High	-
15	Km3.9, Laluan P14,	Moderate-High	-
16	Km4.59 Laluan P14,	Moderate-High	-
17	Lot 2250, Balik Pulau	High	-
18	Lot 10212, Kolej Kemahiran Tinggi Mara	High	Rectification Done
19	Lot 10212, Kolej Kemahiran Tinggi Mara	High	Rectification Done
20	Lot 14315, Regency Height Condominium	High	Rectification Done
21	Lot 1140, Taman Chantek	Very High	Rectification Done
22	Lot 802, Taman Jesselton	High	Rectification Work
23	PBA Air Hitam	-	Rectification Work
24	Rizab Sungai, Kampung Teluk Awak	High	Rectification Done
25	Rizab Jalan, Sungai Pinang	High	-
26	Rizab Jalan, Sungai Pinang	High	-
27	Lot 4769, Kingfisher Series Apartment	High	Rectification Work
28	Lot 6619, Greenlane Park	High	Rectification Work
29	Lot 9625, Pangsapuri Mutiara Indah	Moderate	Rectification Done
30	Lot 11512, Taman Terubong Jaya	Very High	Rectification Work
31	Lot 1416, Kg. Bukit Paya Terubong	Very High	Rectification Work
32	Lot 8840, Ayu Height	Moderate	Rectification Done
33	Lot 4813, Kondominium Boulevard	-	Rectification Work
34	Lot 1506, Taman Terubong Jaya	High	Rectification Done

# FLOOD HAZARD MAP

50 ARI FLOOD HAZARD MAP

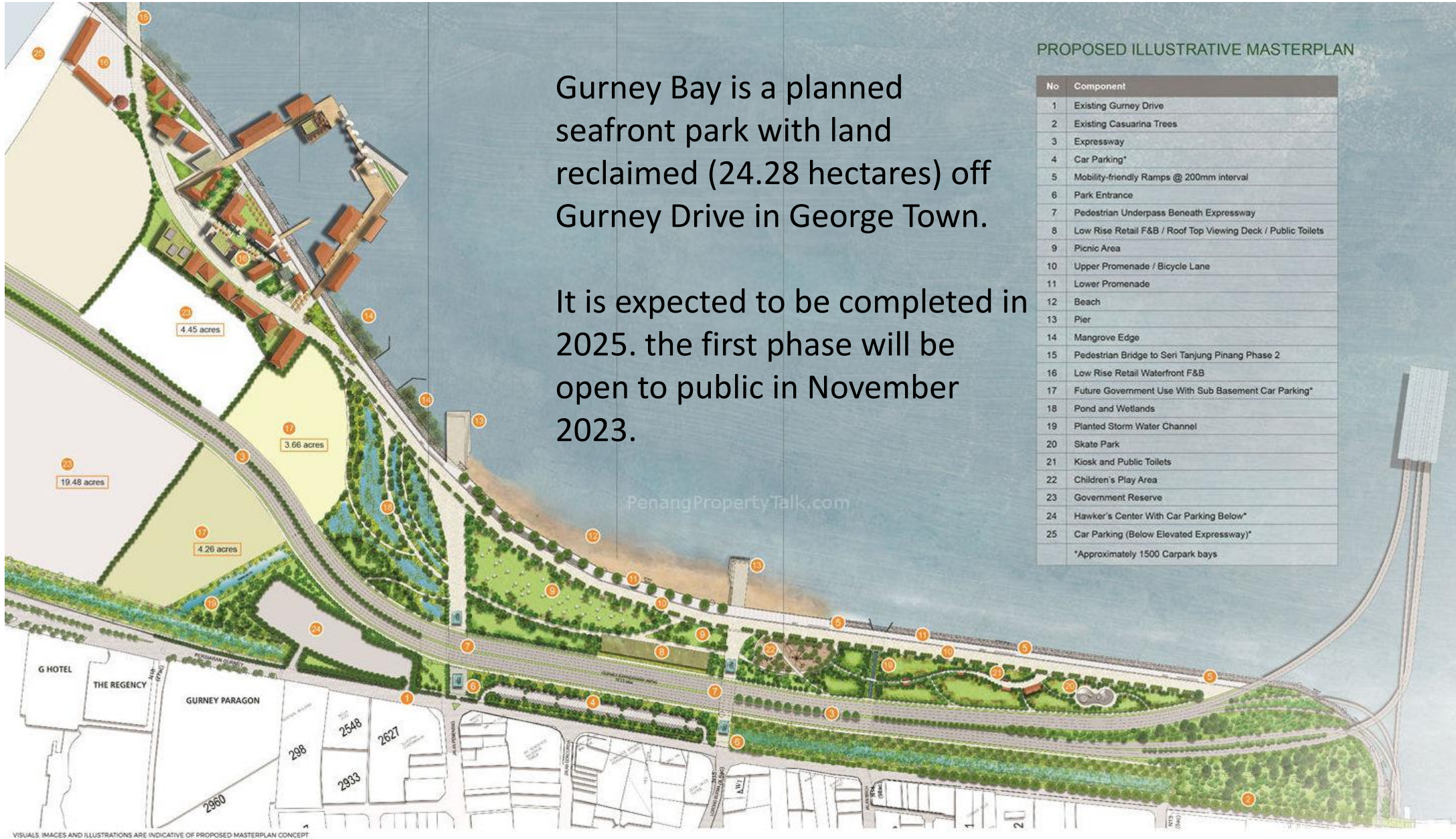
100 ARI FLOOD HAZARD MAP



Sumber: Kajian Pelan Induk Saliran Mesra Alam Bagi Daerah Timur Laut Pulau Pinang oleh JPS (November 2018)



# GURNEY BAY PROJECT

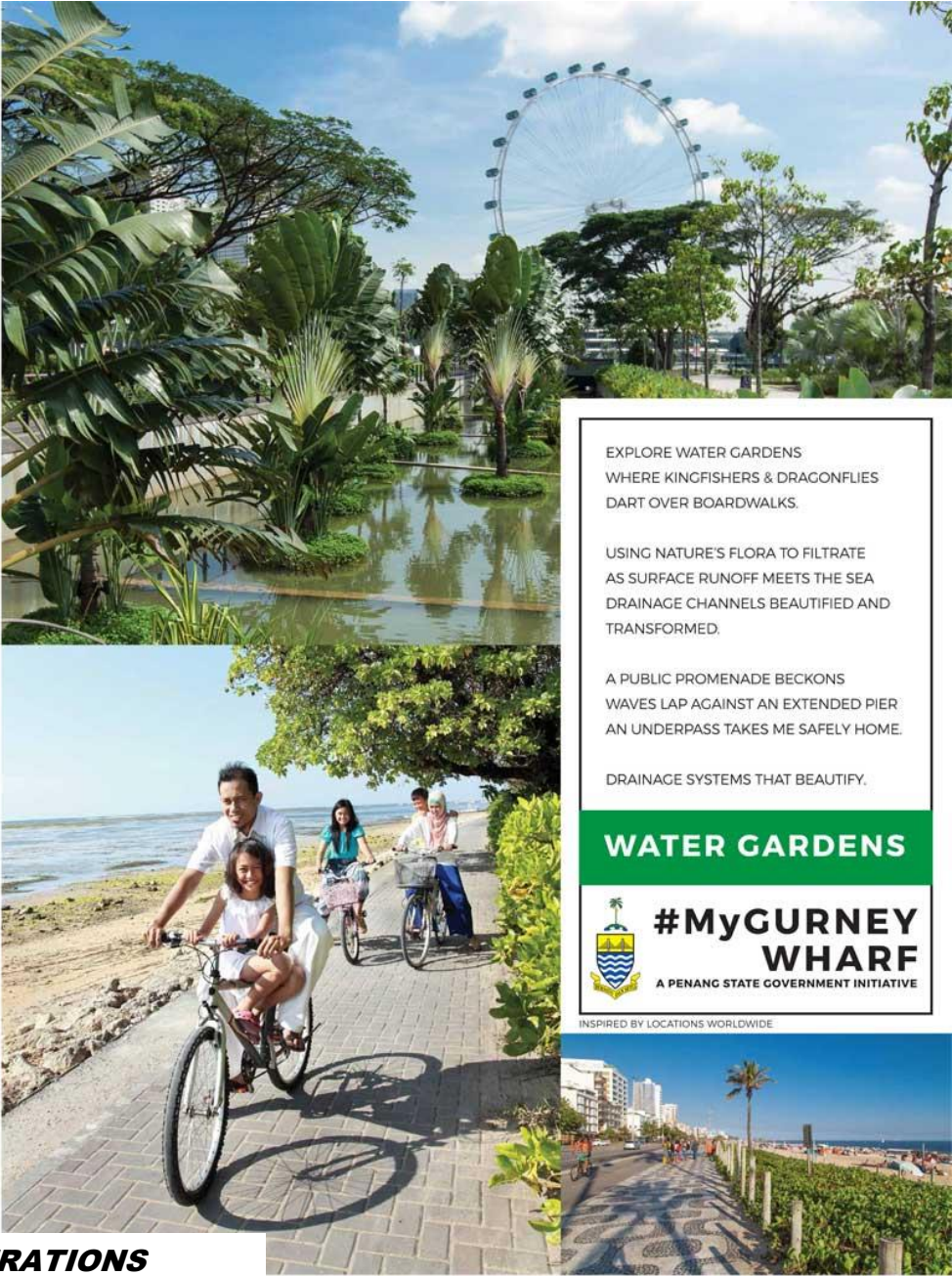


Gurney Bay is a planned seafront park with land reclaimed (24.28 hectares) off Gurney Drive in George Town.

It is expected to be completed in 2025. the first phase will be open to public in November 2023.



# GURNEY BAY PROJECT



ILLUSTRATIONS

ONLY



An aerial photograph of Penang Island, Malaysia. The image shows a dense urban area with a mix of traditional and modern buildings. The city is surrounded by water, with a large bay to the east and a smaller inlet to the south. In the background, there are mountains and a hazy sky. The text '• PENANG' is overlaid on the left side of the image.

• PENANG

# NATURE-BASED CLIMATE ADAPTATION PROGRAMME FOR THE URBAN AREAS OF PENANG ISLAND

CO-ORGANISERS : City Council of Penang island - Think City



# NATURE BASED SOLUTIONS (NBS) HAVE PROVEN TO BE THE MOST EFFECTIVE STRATEGY TO REDUCE TEMPERATURES IN THE CITY

NBS can cool cities between 2°C and 8°C

**Shading**



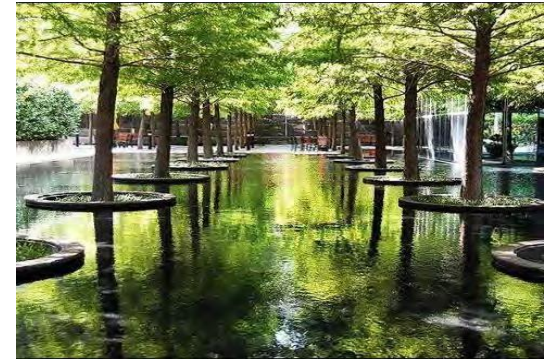
**Through  
evapotranspiration**



**Enhancing wind flows**



**Combining green  
spaces with water  
surfaces**



*Surface cooling can be achieved through increased wind speed, coverage with surface water and shading. The first and last of these, of course can be provided by suitably placed vegetation.*

*(Guide to Urban Cooling Strategies, 2017, p.11)*



A photograph of a city courtyard. In the foreground, there is a paved area with a yellow tactile paving strip. A grassy area with several trees and benches is in the middle ground. Three people are sitting on a bench. In the background, there is a modern glass building and a white building with air conditioning units. The sky is blue.

# Programme Components

- New tree-line streets / Connected canopies constructed
- Pocket parks / vacant spaces constructed
- Green parking spaces
- Urban agriculture programme
- Blue-green corridor

## SPONGE CITY CONCEPT



# PROGRAMME COMPONENTS

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Connected canopies



Backlanes



Pocket parks



Greening open car parks



Green facades



Blue corridors



Swales

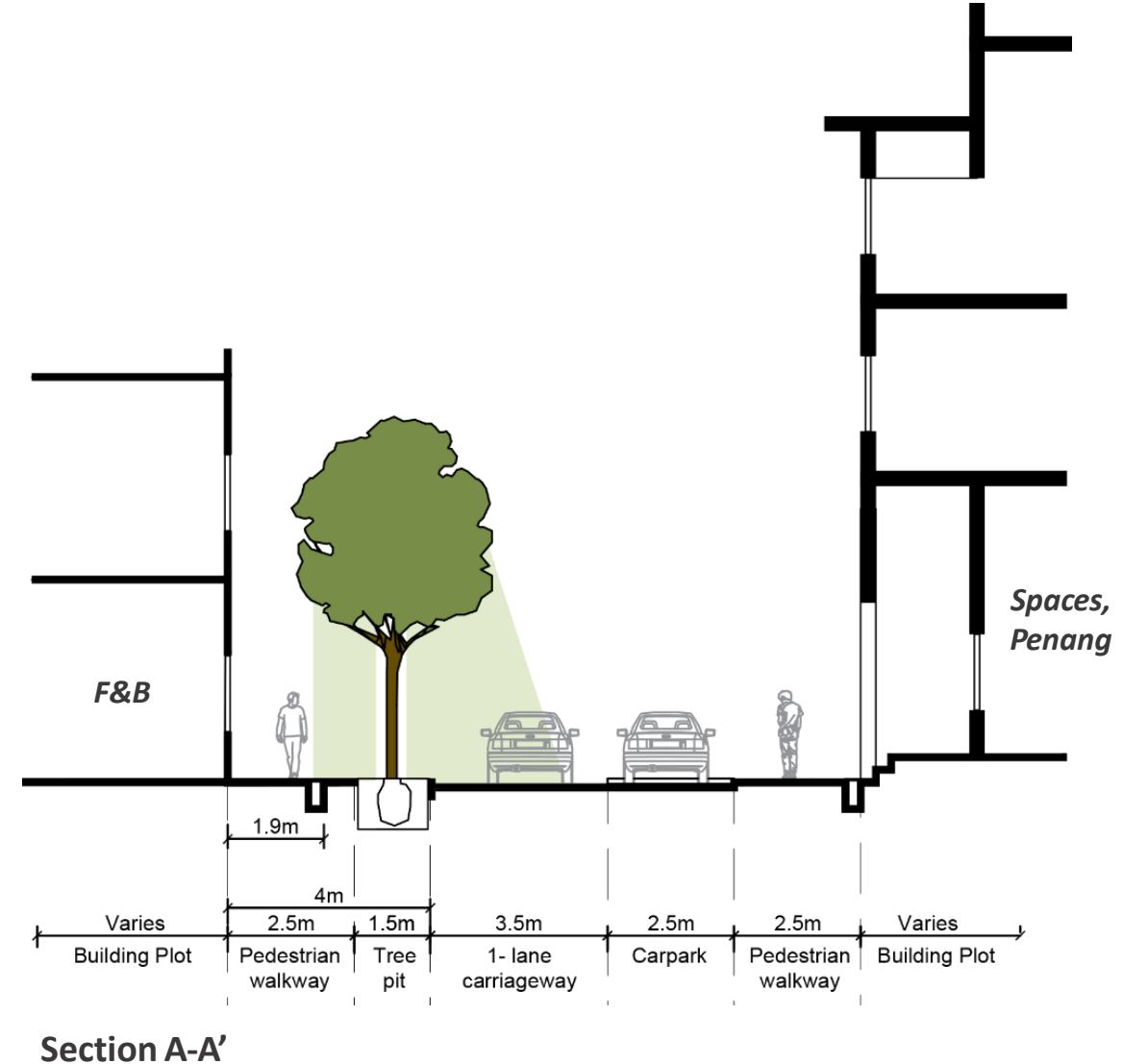


Upstream retention areas



# PENANG NATURE-BASED CLIMATE ADAPTATION PROGRAMME

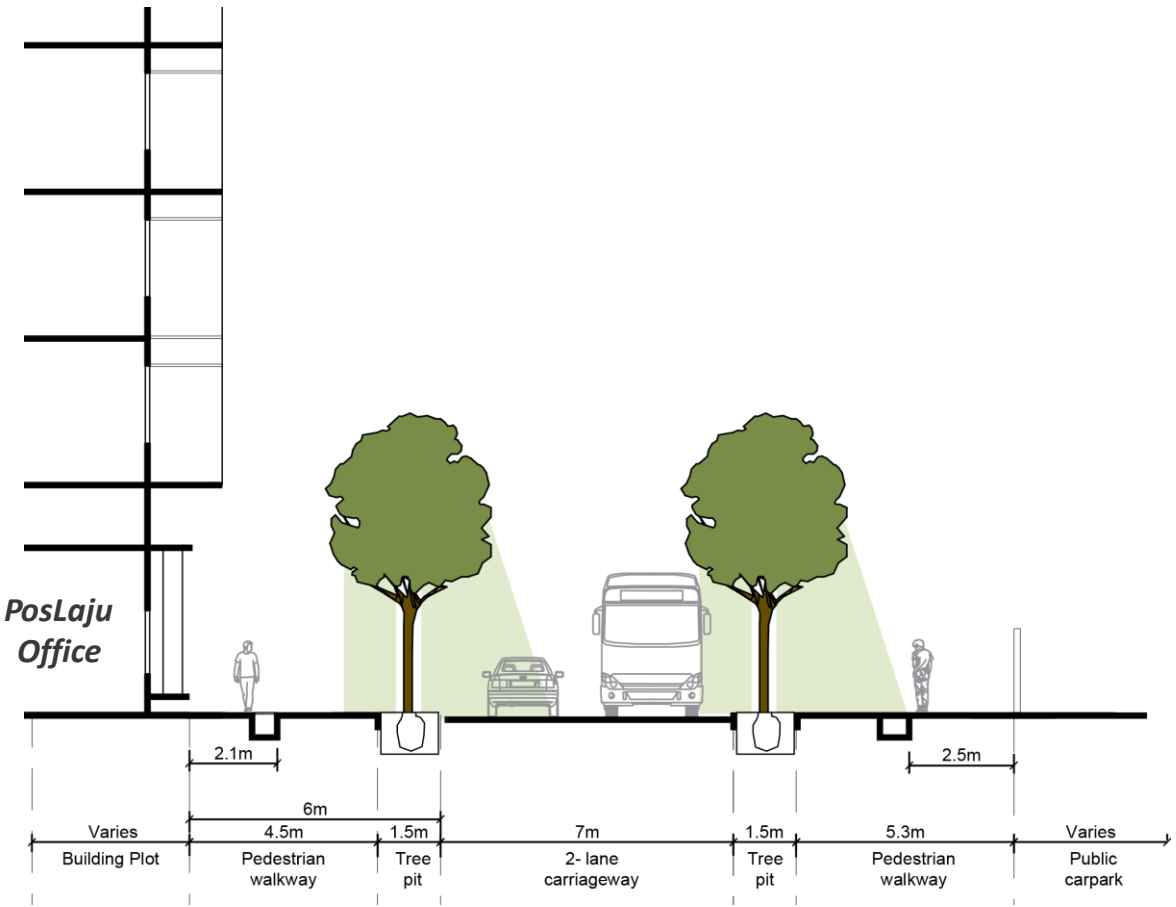
## Pilot Proposal for Urban Greening - Lebuhr Union





# PENANG NATURE-BASED CLIMATE ADAPTATION PROGRAMME

Pilot Proposal for Urban Greening - Lebuh Downing (Option 1)



Section A-A'



# SUCCESSFUL URBAN GREENING PROJECTS IN GEORGE TOWN

## Upgrade streetscape projects



**Armenian Park**  
Completed year 2016



**China Street Ghaut**  
Completed year 2018



**Lebuh Light**  
Completed year 2019



# Business Improvement District Scheme



## UNIVERSAL DESIGN



Implemented **Universal Design** in our public amenities to ensure accessibility and mobility.

# 4P

PUBLIC

PRIVATE

PEOPLE

PROFESSIONAL







## Leading by Example

State Government & MBPP strives to obtain GBI certificate for new MBPP public buildings. Among buildings which had obtained GBI certification are:-

- sPICE
- Relau Sport Complex
- Chowrasta Market
- Homeless Shelter, Jalan C. Y. Choy

These buildings can a guide or benchmark for developers, consultants and all stakeholders to learn, appreciate and implement.





GREEN BUILDING INDEX CERTIFICATE NO.  
GBI-NRNC-0191(P)

DATE OF ISSUANCE  
7 APRIL 2017

## SUBTERRANEAN PENANG INTERNATIONAL CONVENTION AND EXHIBITION CENTRE (SPICE)

NO. 108, JALAN TUN DR, AWANG, 11500 RELAU, PULAU PINANG.

HAS BEEN AWARDED



# CERTIFIED

PROVISIONAL GBI CERTIFICATION

OWNER/APPLICANT  
ECO MERIDIAN SDN. BHD.

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# DA

DESIGN ASSESSMENT



# TRIPLE NET ZERO

- cross ventilation
- Natural ventilation
- 40kWp Sistem solar panel
- led lighting system



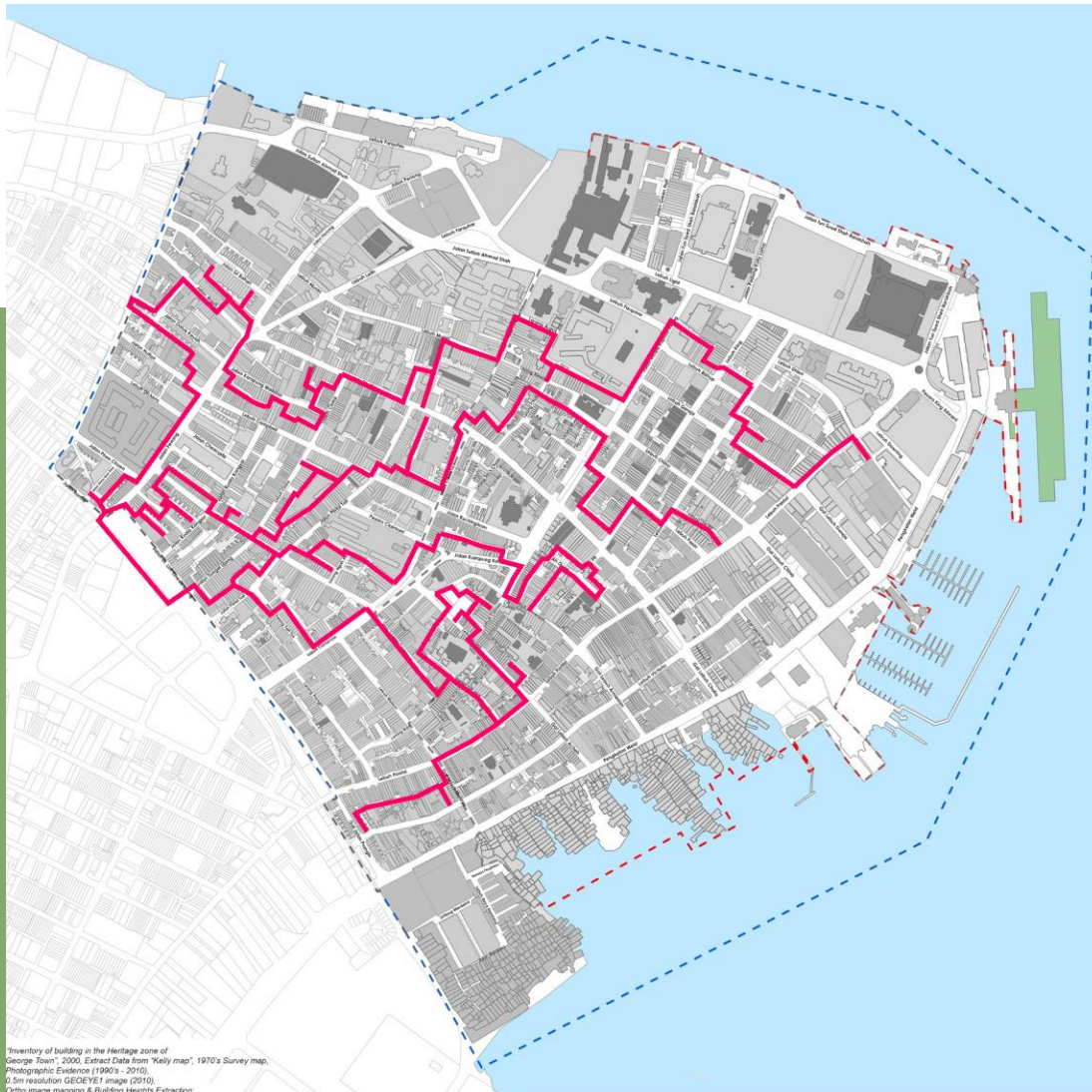
**PLATINUM**



**GREEN BUILDING  
INDEX (GBI)**

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# Back Lane Transformation

9km of rejuvenated backlane and 10 acres of safe green spaces for the public to use, either by walking or cycling In GT-WHS





# GLOBAL CITIES TOWARDS CARBON NEUTRALITY

## THANK YOU

