JABATAN PENGAIRAN DAN SALIRAN
MALAYSIA

WATER QUANTITY CONTROL FOR URBAN RUNOFF

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Presentation Outline

01 INTRODUCTION

02 ISSUES AND CHALLENGES

03 STRATEGIES

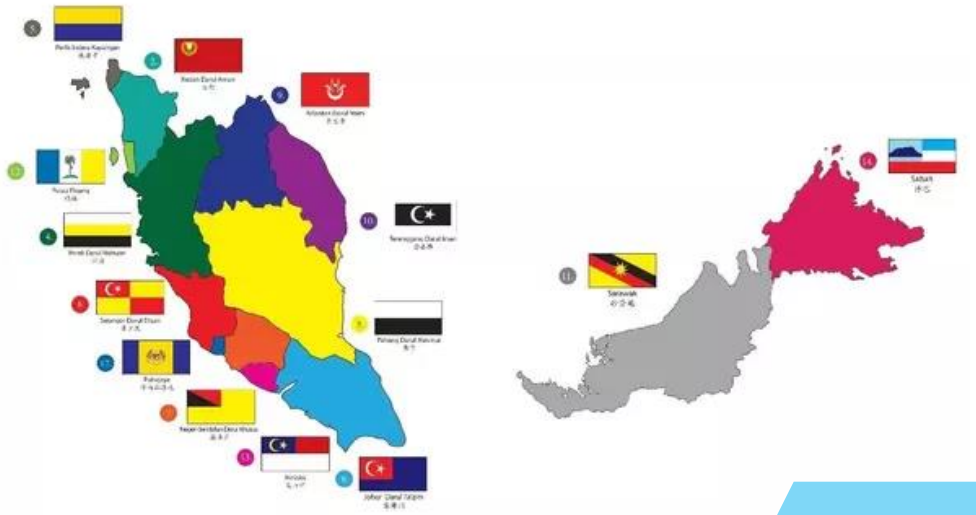
04 CONCLUSION

INTRODUCTION

1

Urbanisation in Malaysia

- “Malaysia is among the more urbanized countries of East Asia, and its urban population continues to increase rapidly”



32.2 million

Total Population of Malaysia in 2019

Source: U.S. Census Bureau (2019)

42.9 million

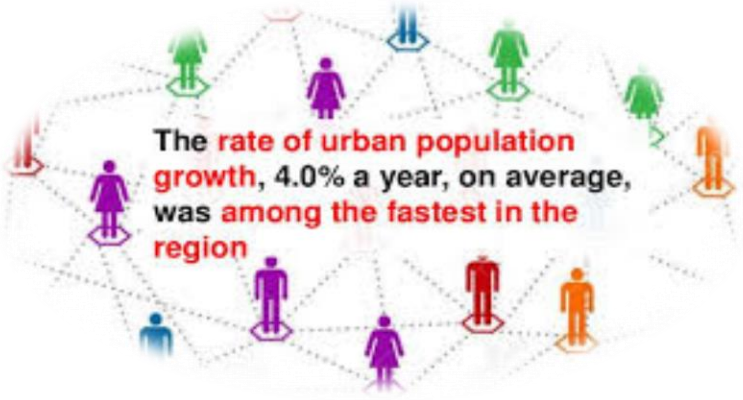
Total Population of Malaysia in 2050

Source: U.S. Census Bureau (2019)

4.0% a year

The rate of urban population growth of Malaysia

Source: World Bank : East Asia's Changing Urban Landscape: Measuring a Decade of Spatial Growth (2015)



Urbanisation Growth in Malaysia

76%

Urbanization growth of Malaysia

Source: www.datareportal.com (2019)

As a developing nation, Malaysia is straddled by fast pace development projects

Malaysia's urban land grew form about 3,900 square kilometres to 4,600 between 2000 and 2010.

1.5%

The average annual urbanization growth rate of Malaysia

Source: World Bank : East Asia's Changing Urban Landscape: Measuring a Decade of Spatial Growth (2015)

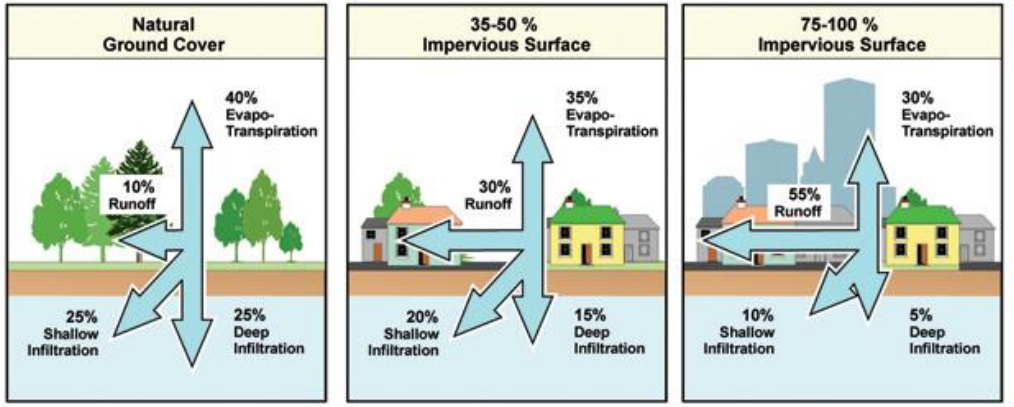
Effect of Urbanisation

< 50%

Impervious surface in rural area

> 75%

Impervious surface in urban area



- **Land use changes, farmland, vegetation cover, and bare soil have been converted into built-up areas and thus increases the area of impervious surfaces through which, water cannot pass through.**
- **As more and more lands are covered with hard impervious surfaces, the amount of water that infiltrates is decreases.**
- **As such, runoff volume are increases and thus increasing peak discharge to the drainage/river.**

Flash Floods in Urban Areas

- **Due to increased development activities and therefore the runoff volume, the number of flash flood occurrence has also increased.**
- **As such, several urban areas/cities of the country suffer from severe flash flood events.**

74

Locations of flash flood in urban area based on National Status of Flash Flood Report 2013

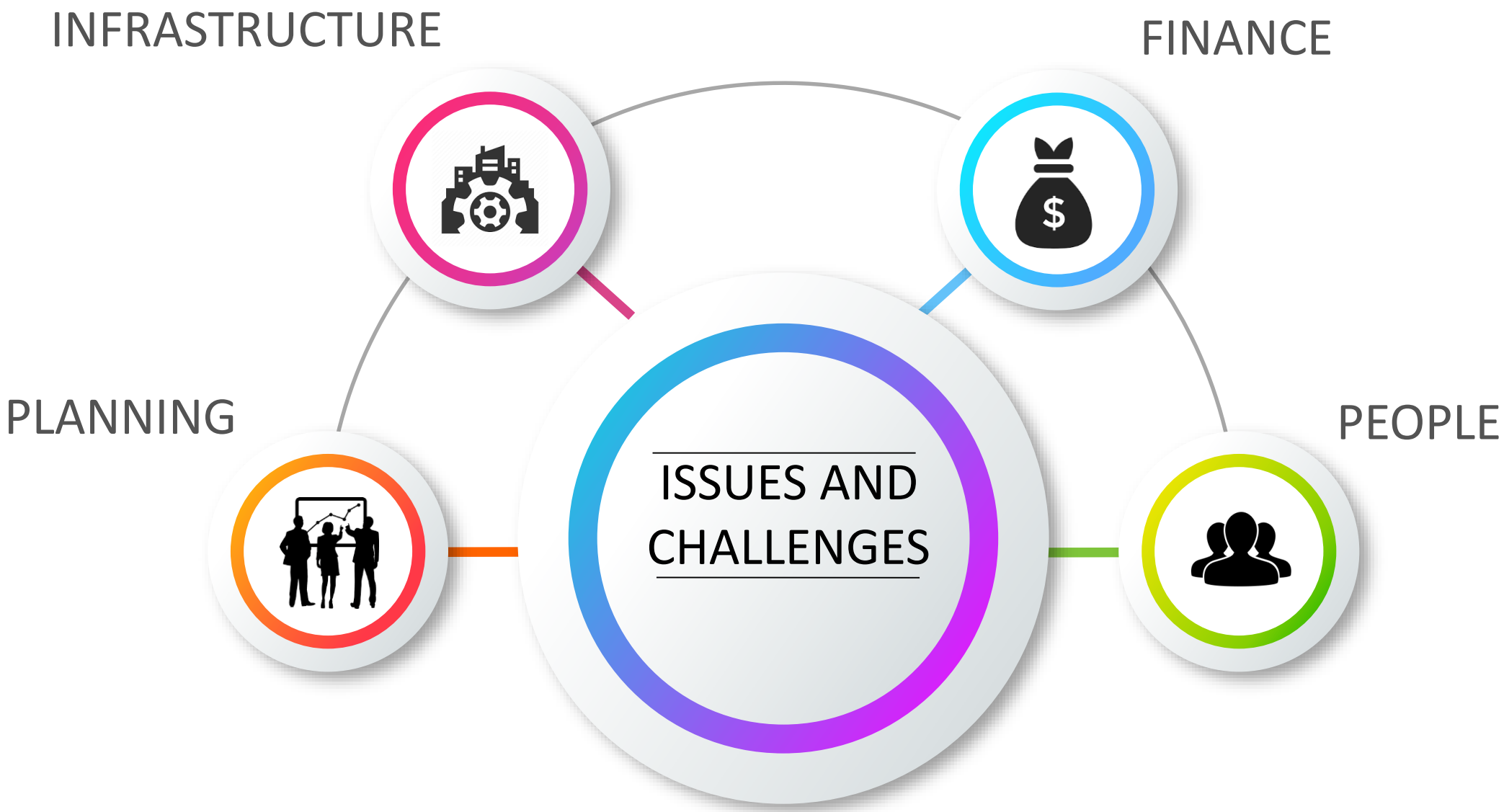
307

Locations of flash flood in urban area based on National Status of Flash Flood Report 2017

ISSUES AND CHALLENGES

2

Issues and Challenges



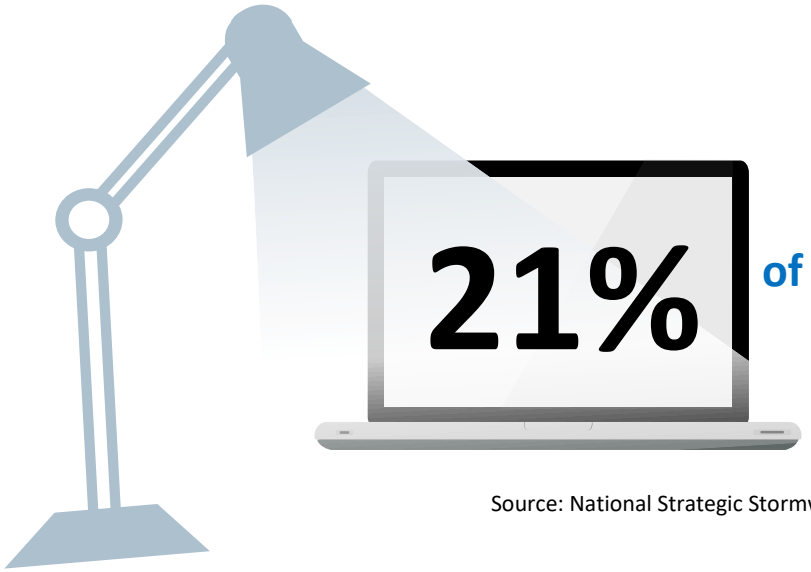
Issue No.1: Planning

Improper urban planning and development in low-lying areas.

There appears to be no formal agreement between these local authorities pertaining to stormwater management matters

There are cases of catchment sharing between local authorities within same state or even in different state

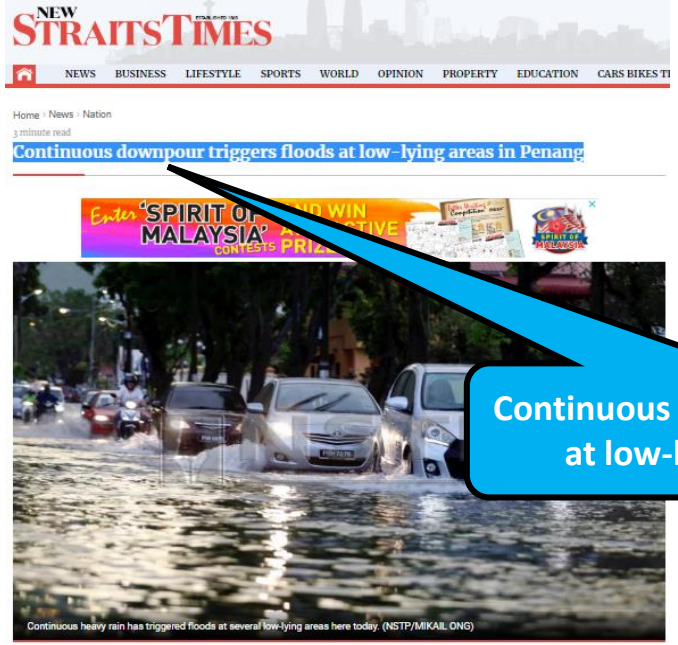
More upstream areas are developed without upgrading stormwater infrastructure at downstream, the number of downstream areas experiencing flood have increased.



of the flash floods occurred in the low-lying areas

Source: National Strategic Stormwater Management Plan (2007)

Issue No.1: Planning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3 minute read

Continuous downpour triggers floods at low-lying areas in Penang

Enter 'SPIRIT OF MALAYSIA' CONTESTS

Continuous heavy rain has triggered floods at several low-lying areas here today. (NSTP/MIKAIL ONG)

By Mohamed Basyir
February 20, 2019 @ 8:35pm

RECOMMENDED

Rainfall once in two days vital to ensure smooth monsoon season

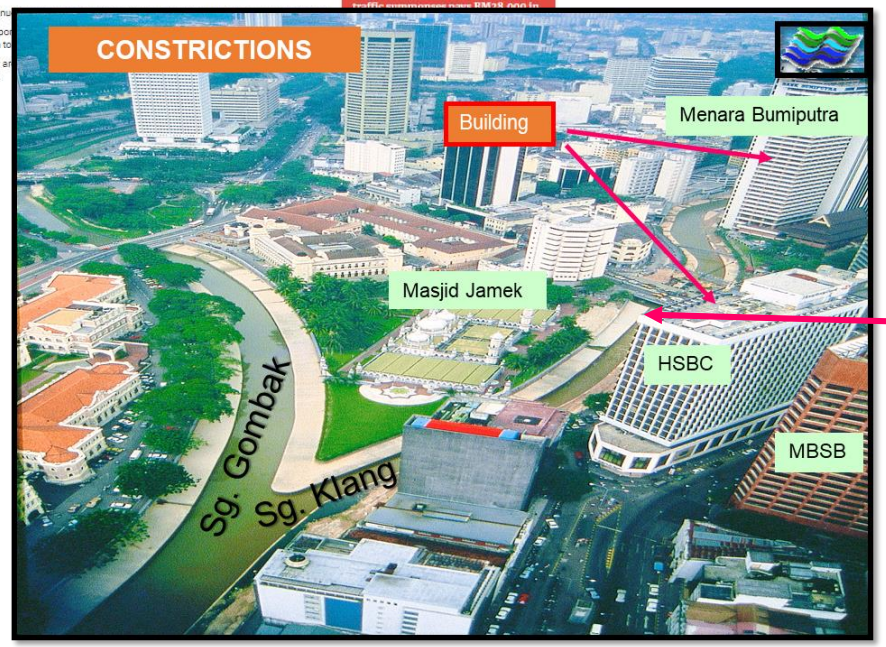
Singaporean with 116 outstanding

GEORGE TOWN: Continu

The downpour was repor
deep water since 5pm to

Amongst the reported ar
Stadium Lorong Kulit.

Continuous downpour triggers floods at low-lying areas in Penang



Gombak River Section, Near Jalan Raja Laut (LRT Bandaraya Station)

LRT Piers

Bridge

Klang River Section, Jalan Tun Perak Bridge (Masjid Jamek)

Issue No.2: Infrastructure

01 Insufficient Drainage System due to New Development

- **Insufficient drainage system to cater for runoff generated by heavy rainfall.**
- **Built up area not served with proper drains and there is no drain reserve available.**
- **Drainage system has long existed since pre-development days. As such they are inadequate to cope with increased surface runoff.**

02 Technologies Pertaining To Stormwater Are Not Fully Developed

- **Lack of innovation in terms of Capital Expenditure (CAPEX) and Operational Expenditure (OPEX)**
- **Lack of Innovation (R&D) of new products**
- **Lack of data and information**

13%

of the flash floods occur due to insufficient drainage system

Source: National Strategic Stormwater Management Plan (2007)

Issue No.2: Infrastructure

Star ONLINE

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TOPICS ▸ #AnakAnakMalaysia2019 | Matta Fair | SOBA 2019 | Export Excellence Awards 2019 | Asean+ | True or No

More must be done to prevent floods

VIEWS

Tuesday, 13 Jan 2015
12:00 AM MYT

By Ravindran Raman Kutty

Urban flood woes: Local authorities must monitor drainage in the city to prevent th flash floods in urban areas.

AFTER more than 30 years, we recently encountering massive flooding with more than 100,000 people evacuated throughout Malaysia. The N monsoon displayed its full strength, devastating the east coast and sou peninsular Malaysia.

Unfortunately, flash floods can develop in just a few minutes of rain an local, impacting a neighbourhood or community, or very large, affectin basins.

Localised heavy monsoon rains from a series of storms moving over the causes flooding when the rate of rainfall exceeds the drainage capacity When this occurs on tilled fields, it can result in here s picked up by run off and carried as suspended matter.

New Straits Times

DID, agencies to discuss flood woes

KAJANG: The Drainage and Irrigation Department (DID) and related agencies are expected to meet today to discuss a solution to the flood problem in Kajang town.

A DID spokesman said heavy rainfall was the cause of the flash flood that hit the Kajang market area on Sept 29.

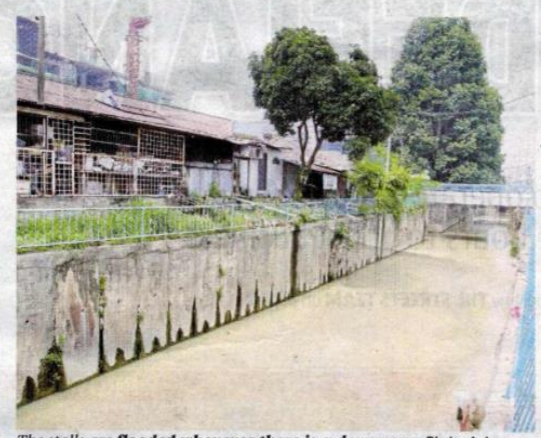
"The rainfall reached a staggering 6.3cm within one to two hours. The overflow from north Kajang town entered the lower land area thus causing the flood," she said.

"The river flow of Sungai Jelok was also disrupted by cables, tree trunks and garbage."

Stall owner Yee Kim Long, 41, said operators at Gerai Medan Selera near Kajang Market had been suffering from floods for about 15 years, since the development of Plaza Metro Kajang.

"After the development of Plaza Metro which is located 60m away from here, in 1999, we have suffered from floods every time it rains heavily," said Yee, adding that there were 80 stalls.

"We think that the location of Plaza Metro is not suitable as it obstructs the flow of the river."



*The stalls are **flooded whenever there is a downpour**.* Pic by Azhar Ramli

Asked about the plan to relocate the stalls for a flood mitigation project, most traders said the temporary location must be near Kajang town.

A stall operator, who wanted to remain anonymous, said his stall next to the river was flooded whenever there was a downpour.

"Once the water level rose to about 0.6m. That was before the bridge over Sungai Jelok was upgraded. After the bridge was upgraded last year, we experienced fewer flash floods.

"When there is a flood, our goods will be damaged or swept away. We also need to clean up afterwards," said the man who has been operating there for almost 20 years.

He said he believed that the new development mushrooming along Sungai Jelok and poor drainage had contributed to flash floods.

Jalan Bukit Kajang Hawkers Association chairman Hoo Saw Chim said the association had submitted a proposal to Kajang assemblyman Datuk Seri Dr Wan Azizah Wan Ismail in March.

"We are still waiting for a dialogue session. The proposal includes an urban regeneration plan for the hawker stalls where we agree on temporary relocation," said Hoo.

He said the stall operators wanted the authorities to build a hawker centre while widening the river.

"We need a modern hawker centre to keep up with the rapid developments in Kajang town," said Hoo, adding that improper garbage disposal in the river had caused blockages and flooding.

"They need to go to the root of the problem to solve it. For example, there are no catchment areas to reduce the water levels when it rains heavily." By Farhana Syed Nokman

Contra-flow in Jln Sungai Buloh

KUALA LUMPUR: Medium-term night contraflow traffic will be implemented along a 2km stretch of Jalan Sungai Buloh (Kuala Selangor-bound) from the junction of Persiaran Jati to the junction of Jalan Welfare from tomorrow to Nov 14, between 11pm and 5am.

This to facilitate the launch of gantry activities crossing Jalan Sungai Buloh in front of the abandoned Caltex petrol station.

Motorists from Subang heading to Kuala Selangor will be diverted to the opposite lane. One traffic lane will be made available for each direction (Subang and Kuala Selangor-bound). Motorists may still access Jalan Baru Sungai Buloh, but will be directed by flagmen to enter and exit at traffic lights in Jalan Welfare.

Localised heavy monsoon rains from a series of storms moving over the same area cause flooding when the rate of rainfall exceeds the drainage capacity of the area

Issue No.3: Finance

01 Inadequate Funding for Projects Implementation

01

Inadequate funding is a binding constraint for effective stormwater structure management.

02

Limited capital and high expenditure of stormwater projects.

03

Local authority also not enough fund and man-power for projects implementation

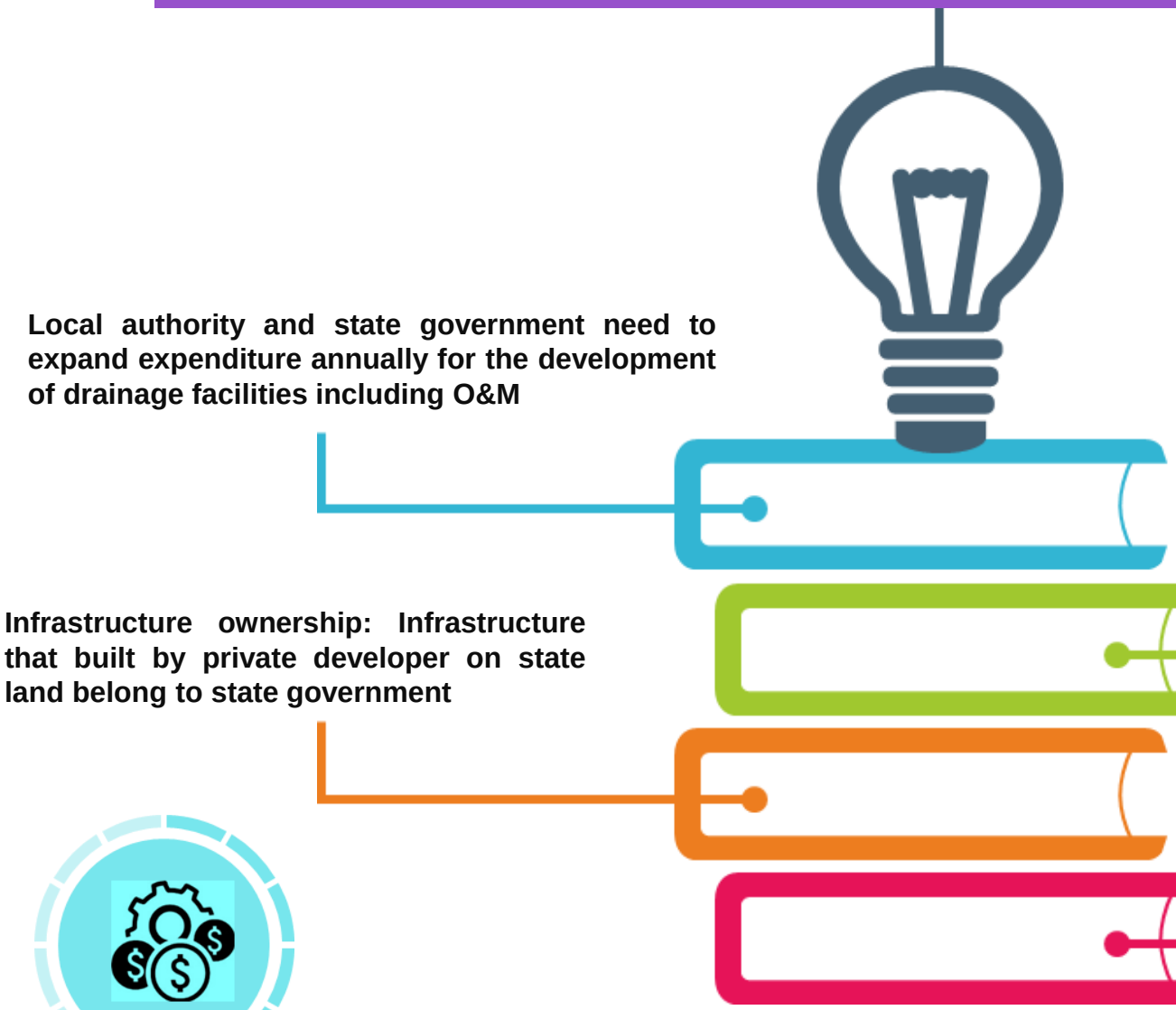
12% **a year**

of the flash floods occur due to poor maintenance of the stormwater infrastructure

Source: National Strategic Stormwater Management Plan (2007)

Issue No.3: Finance

02 Inadequate Funding for Operation & Maintenance (O&M)



Local authority and state government need to expand expenditure annually for the development of drainage facilities including O&M

Local authority needs to find another source of income e.g. assessment rate, drainage fee, Licensing fee or drainage contribution

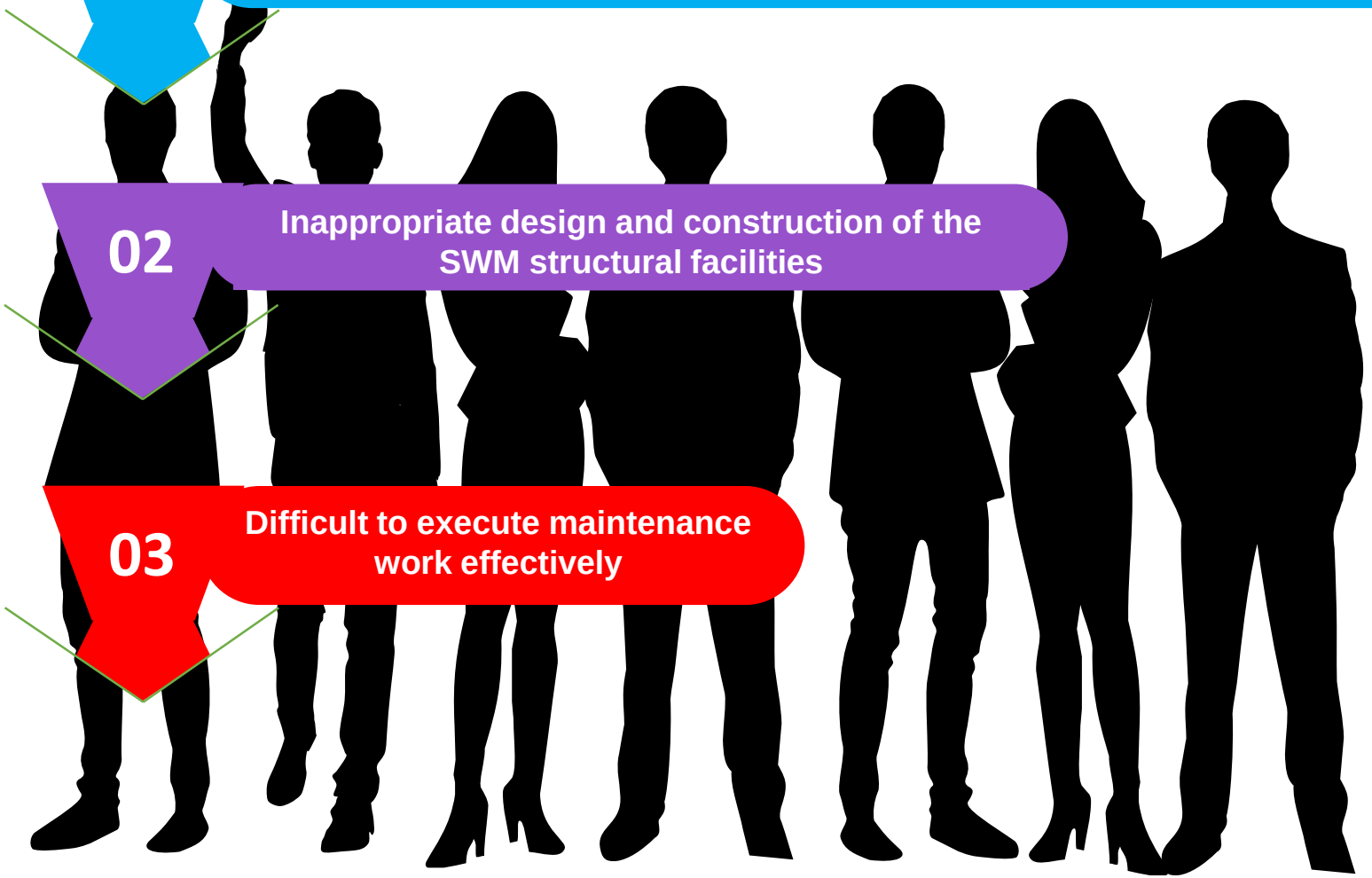
Infrastructure ownership: Infrastructure that built by private developer on state land belong to state government

O&M responsibility for the completed storm drainage facilities shared between DID & Local Authority

Issue No.4: People

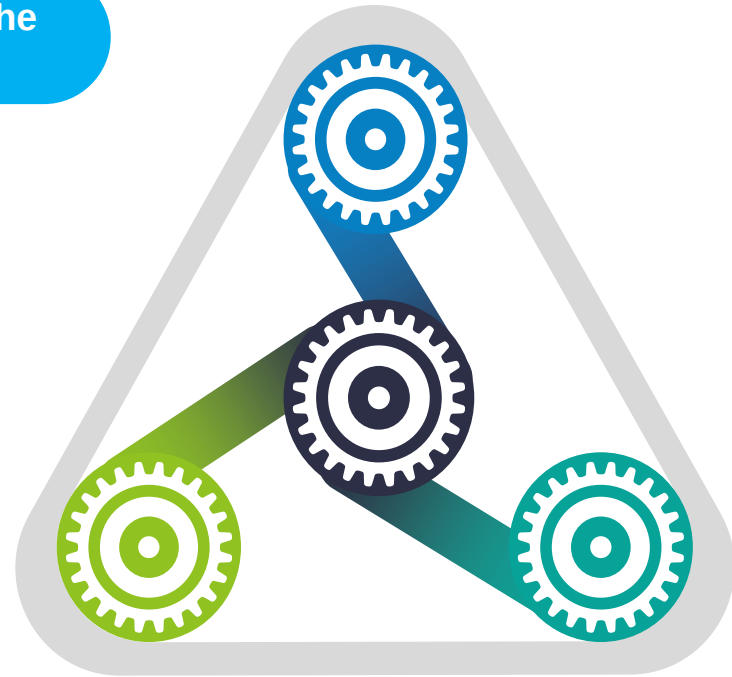
Lack of Competency (Consultants, Authorities and Contractors)

01 Not knowing the function of the specific stormwater structure causes the difficulties in designing, checking and construction work



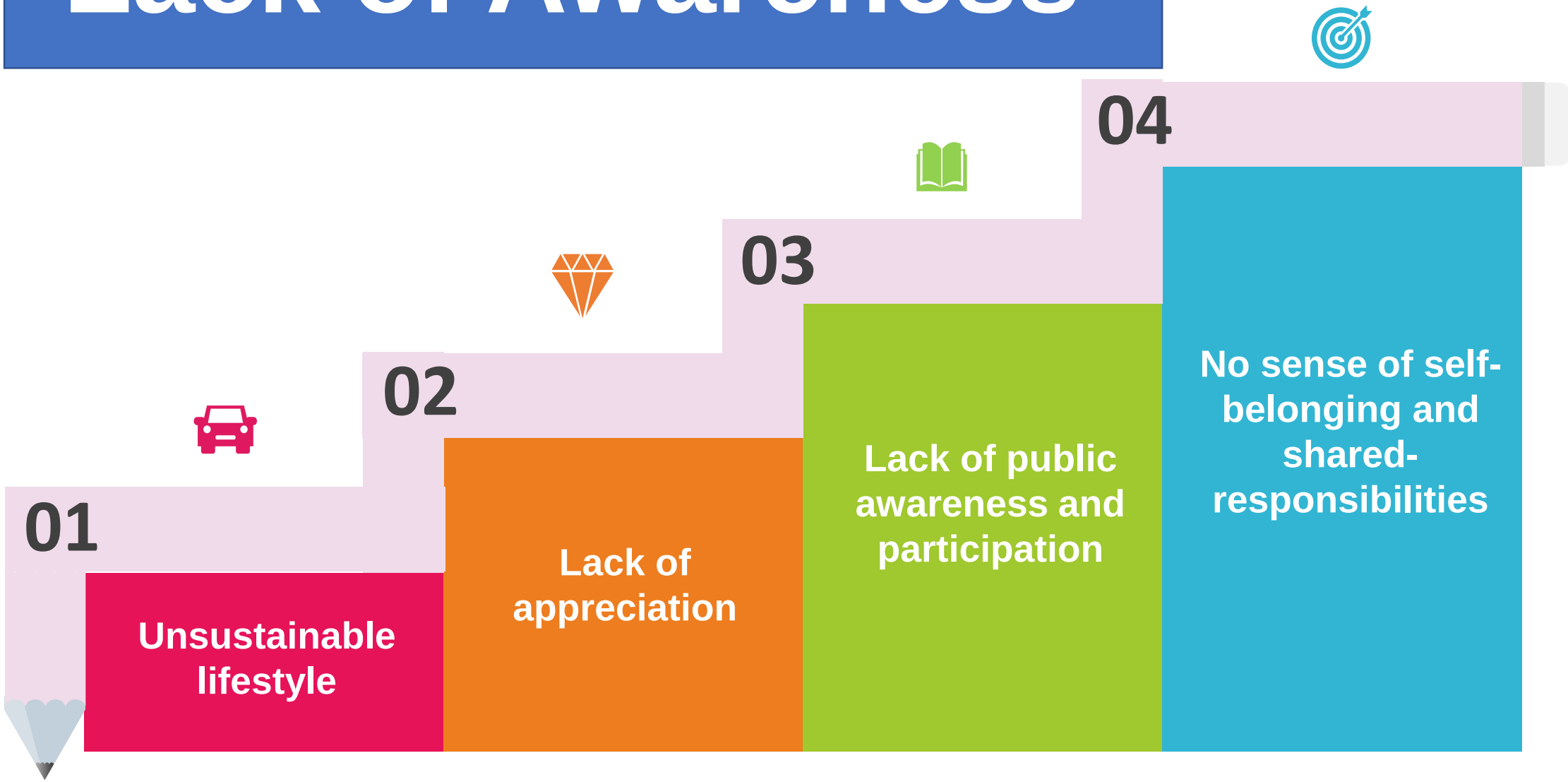
02 Inappropriate design and construction of the SWM structural facilities

03 Difficult to execute maintenance work effectively



Issue No.4: People

Lack of Awareness



STRATEGIES

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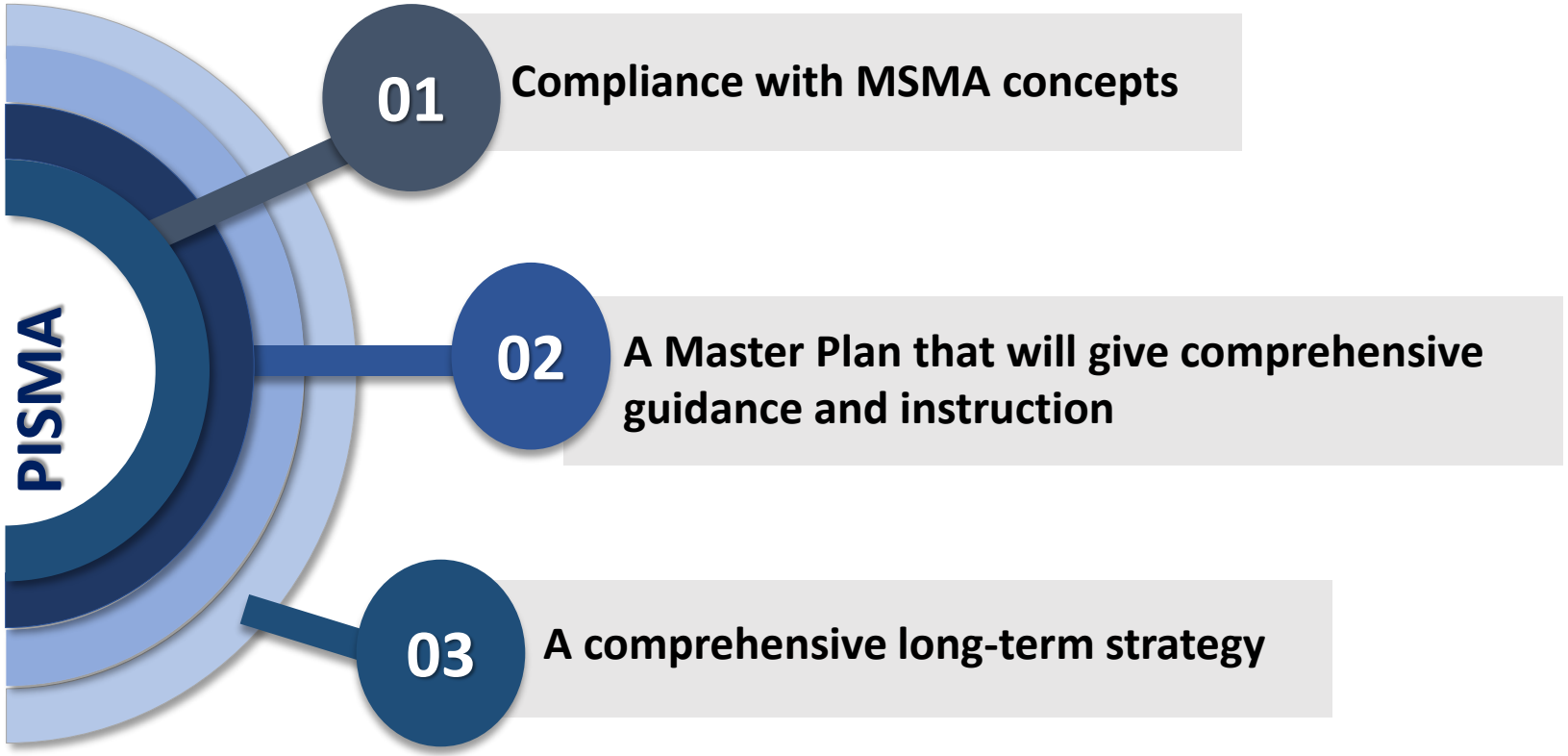
Stormwater Management and Drainage Masterplan (PISMA)

"It is a document that outlines the long-term solutions for overcoming flash floods in urban areas and planning more systematic approach for future development"



Strategies No.1: Planning

Retrofit and Upgrade Existing Stormwater Structure

ELEVENTH MALAYSIA PLAN 2016-2020
ANCHORING GROWTH ON PEOPLE

Source: aseanup.com

- **Retrofit and upgrade the existing stormwater structure.**
- **Comply with MSMA concepts.**

21

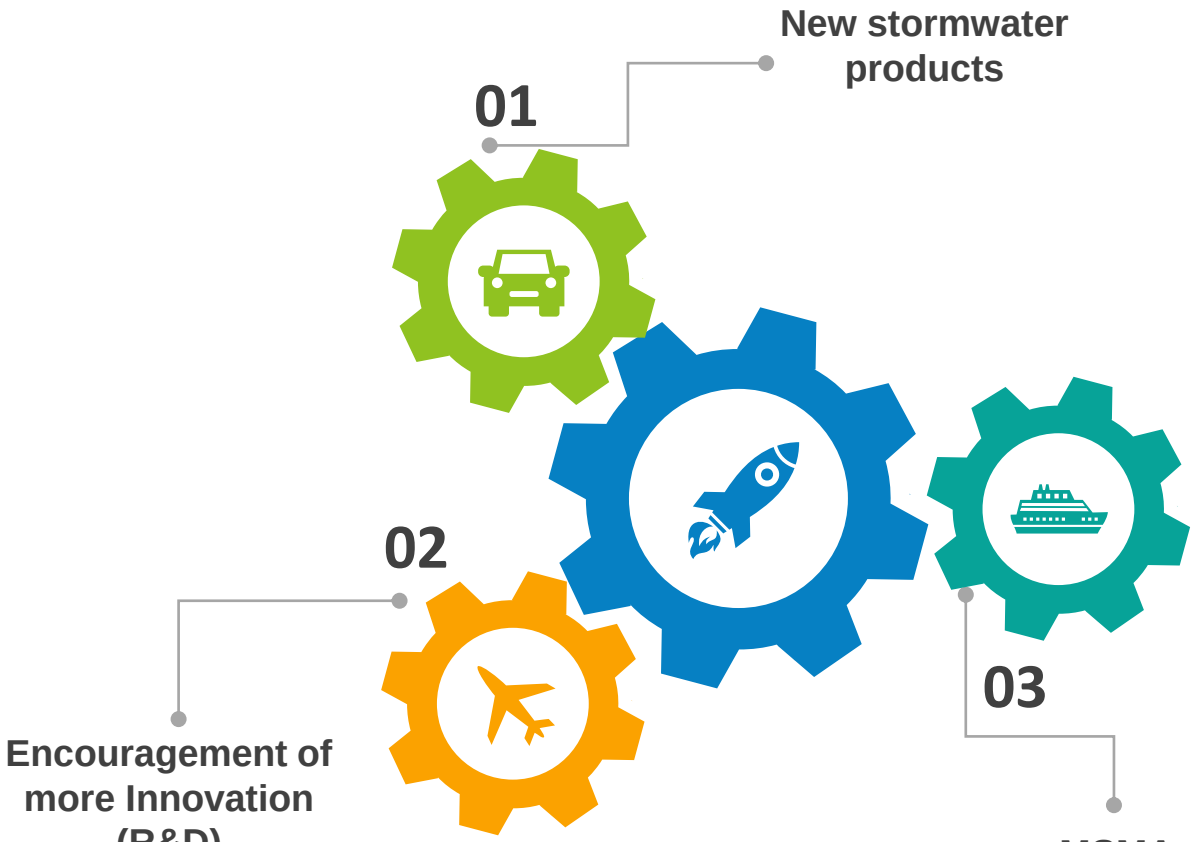
number of stormwater projects undertaken by DID through Urban Drainage Division in Eleventh Malaysia Plan

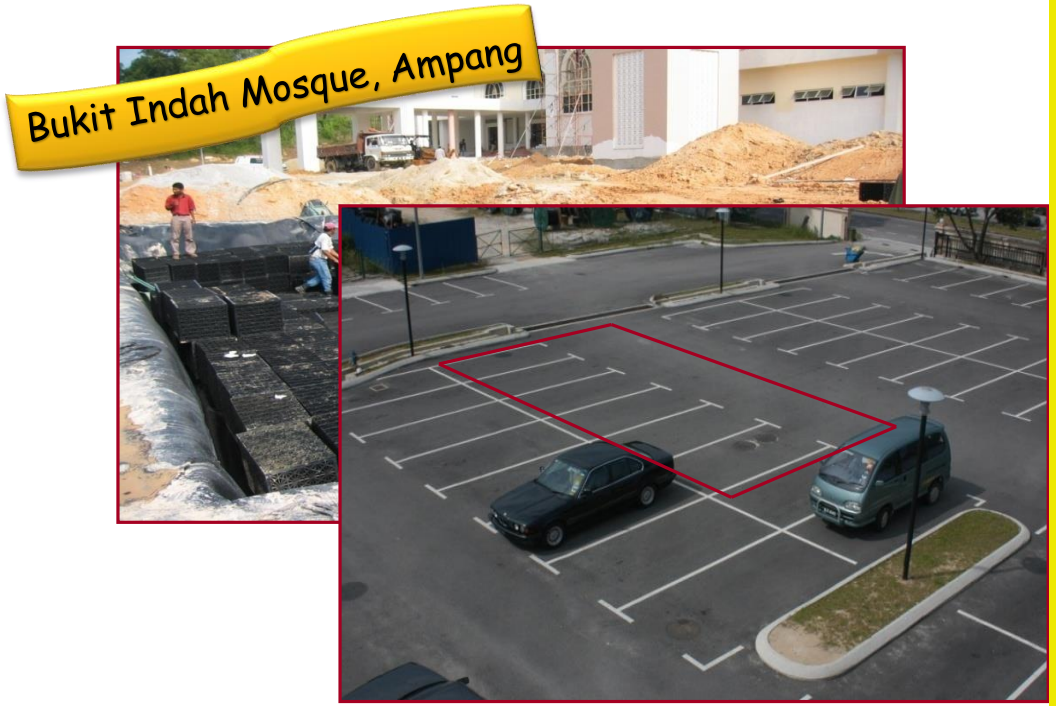
16

number of stormwater studies undertaken by DID through Urban Drainage Division in Eleventh Malaysia Plan

Strategies No.2: Infrastructure

Develop New Stormwater Technologies and Innovation





Rainwater harvesting concept using Underground Storage at Bukit Indah Mosque, Ampang

Strategies No.2: Infrastructure

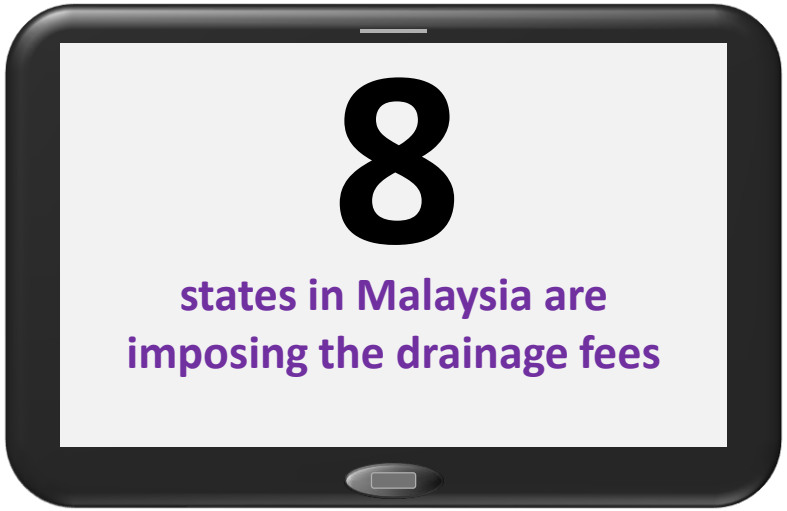
Strategies No.3: Finance

01 Impose Drainage Contribution Fee Throughout Malaysia

- **Impose drainage contribution fee to every developer to carry out drainage system projects in the state throughout Malaysia.**
- **The drainage contribution fee collected from developers can be used to facilitate the drainage projects and maintenance.**

02 Impose Stormwater Security Deposit In Construction

- **Impose stormwater collateral warranties so that the Government accepts no liability for defects and damages after the construction and the developers becomes liable to carry out repairs at his own cost which is more prevalent in commercial leases.**



Strategies No.3: Finance

03 Impose Discharge Rate

- Impose stormwater discharge rate to each residential unit
- The amount is payable annually

04 Government grant for Continuous Maintenance of Stormwater Infrastructure

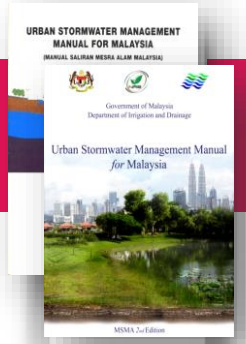
- In 2019, the Cabinet of Malaysia has approved grant for maintenance works of detention ponds.

2211

Number of detention ponds throughout Malaysia

Strategies No.4: People

01 Competency in design and enforcement according to MSMA



- MSMA as part of important subject in university
- MSMA training programme (Government, Agencies, Privates)

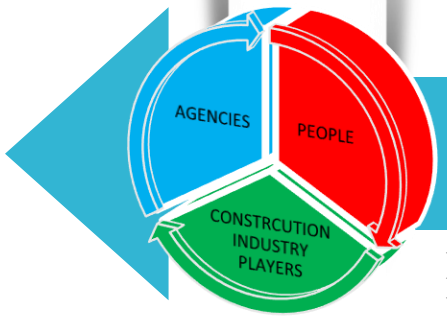
02 Certification Program

- Certified Inspector of Sediment and Erosion Control (CISEC)
- Certified Professional in Erosion and Sediment Control (CPESC)
- Certified Professional in Stormwater Quality (CPSWQ)

03 Public Outreach Program

- Implementation of sustained programs
- Public training and education from young age

04 Stakeholder Participation



- Revised existing regulatory and management framework
- Gather supplementary information and data pertinent to the stormwater strategy plan

CONCLUSION

4

- ✓ Stormwater quantity issues should be taken care by all parties.
- ✓ Integrated Stormwater Management (ISWM) is a holistic approach to solve stormwater quantity issues for a long-term measure.
- ✓ Provide more competency and certification program related to the stormwater quantity management.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-- THANK YOU --