

# The Institution of Engine The Institution of Engine THE MONTHLY BULLETIN OF THE INSTITUTION OF ENGINEERS, MALAYSIA

## APRIL 2023

# Sustainability of Urban Development



- Annual Reports
- Booklets
- Brochures
- Buntings
- Business Cards
- CD / DVD Replications
- CalendarsCards & Invitations
- Certificates
- Custom Printings
- Envelopes
- Folders
- NCR Bill Books
- Notepads
- Leaflets

- Letterheads
- Paper Bags
- Posters
- Stickers
- Others

#### For enquiries, please contact:



## The Choice of Professionals

#### Dimension Publishing Sdn Bhd [199701034233 (449732-T)]

- Level 18-01-02, PJX-HM Shah Tower, No. 16A, Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia.
  - └→ +603 7493 1049
    └→ +603 7493 1047
  - ➡ info@dimensionpublishing.com
- Joseph How :+6011 1234 8181 Shirley Tham :+6016 283 3013



# PERMANENT WATERPROOF AND PROTECTION SYSTEM FOR CONCRETE

Xypex Crystalline Technology is trusted to waterproof and protect critical concrete infrastructure from liquids and chemicals.

Its effectiveness is evident in the Thames Tideway Tunnel, known as London's "super sewer." During the design phase, technical discussions were held to explore how Xypex Crystalline Technology could reduce concrete permeability and address the challenge of construction joints. Xypex Admix C-Series was added to the tunnel concrete, eliminating the need for waterproofing membranes, saving costs, and reducing construction time.

Xypex is the preferred choice for engineers and contractors worldwide, whether it's for new construction, rehabilitation, or fast repair. **Contact us today to discuss your waterproofing project!** 



Thames Tideway, the Hammersmith Connection Tunnel





Thames Tideway scheme



Xypex team at Thames Tideway jobsite

37 Jalan Putra Mahkota 7/7B, Putra Heights 47650 Subang Jaya, Selangor Darul Ehsan

+603-51928186 / Fax: +603-51926826
 support@waterproofing.com.my
 www.waterproofing.com.my



RNC Integral Concrete Technology (M) Sdn Bhd (436178-D) Exclusive applicator and distributor for Xypex in Malaysia, for Xypex: Sustainability In Concrete Structures solutions that includes concrete repair, protection and durability enhancement.



# Introductory Rate for New Advertisers



### Full-Page, Full-Colour Advertisement

- This one-time-only special rate offer is for new advertisers.
- · Space availability is subject to booking on a first-come-first-served basis.
- Clients will provide ready-to-print artwork in PDF format with 300dpi.
   <u>Full page: 210mm x 285mm, 5mm extra bleed sizes for 4-sided with crop mark.</u>
- Advertising space must be utilised before 30 June 2023.
- \*Please note that the above rate will be subjected to 6% SST. For overseas advertisers, an additional 25% will be charged.
- Rate shown above excludes 15% advertising agency commission.

The Choice of Professionals

tution of Engineers, Malaysia (IEM) - IURUTERA

- Payment term: Full advance payment.
- Artwork submission deadline is on (or before) the 1st week of the prior month of publication.
- After the material deadline, no cancellation or alteration to the advertisement will be entertained.
- Any cancellation after signing the advertising order will result in a 50% penalty charge.
- The publisher reserves the right to edit, revise or reject any advertisement deemed unsuitable or inappropriate.

## Circulation & Readership Profile

JURUTERA has an estimated readership of 200,000 professionals. Our esteemed readership consists of certified engineers, decision making corporate leaders, CEOs, government officials, project directors, entrepreneurs, project consultants, engineering consulting firms and companies involved with engineering products and services.

Name of Company:			
Address:			
Tel:	Fax:	Contact Person (s):	
Email Address:			
Publication month/s	:		
Company's Stamp &	Authorised Signatu	re	Date
For enquiries, plea	ase contact:		
dime	ensionpublishing	Dimension Publishing Sdn Bhd [ 199701034233 (449732-T) ]	

Level 18-01-02, PJX-HM Shah Tower, No. 16A, Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia.

€ +603 7493 1049
 € +603 7493 1047
 ∞ info@dimensionpublishing.com

Joseph How :+6011 1234 8181 Shirley Tham :+6016 283 3013





#### Number 04, APRIL 2023

IEM Registered on 1 May 1959

#### MAJLIS BAGI SESI 2022/2023 (IEM COUNCIL SESSION 2022/2023) NG DIPERTIJA / PRESIDER

Ir. Prof. Dr Norlida bt Buniyamin YANG DIPERTUA / DEPUTY PRESIDENT Ir. Prof. Dr Jeffrey Chiang Choong Luin Ir. Yau Chau Fong, Ir. Mohd Aman bin Hj. Idris, Y. Bhg. Dato' Ir. Ahmad Murad bin Omar, Ir. Chen Harn Shean, Ir. Mohd Khir bin Muhammad, Ir. Prof. Dr Tan Chee Fai, Ir. Abdul Razak bin Yakob SETIAUSAHA KEHORMAT / HONORARY SECRETARY Ir. Prof. Dr Zuhaina binti Zakaria

**BENDAHARI KEHORMAT / HONORARY TREASURER** Ir. Dr Lee Yun Fook

**BEKAS YANG DIPERTUA TERAKHIR / IMMEDIATE PAST PRESIDENT** Ir. Ong Ching Loon

DIPERTUA / PAST PRESIDENTS Y.Bhg. Dato' Ir. Dr Gue See Sew, Y.Bhg. Dato' Paduka Ir. Keizrul bin Abdullah, Y.Bhg. Academician Tan Sri Dato' Ir. Prof. Dr Chuah Hean Teik, Y.Bhg. Dato' Ir. Lim Chow Hock, Ir. Dr Tan Yean Chin, Ir. David Lai Kong Phooi

WAKIL AWAM / CIVIL REPRESENTATIVE Ir. Yap Soon Hoe WAKIL MEKANIKAL / MECHANICAL REPRESENTATIVE Ir. Dr Aidil bin Chee Tahir WAKIL ELEKTRIK / ELECTRICAL REPRESENTATIVE Ir. Francis Xavier Jacob WAKIL STRUKTUR / STRUCTURAL REPRESENTATIVE Ir. Gunasagaran Kristnan WAKIL KIMIA / CHEMICAL REPRESENTATIVE Ir. Dr Chong Chien Hwa WAKIL LAIN-LAIN DISPLIN / REPRESENTATIVE TO OTHER DISCIPLINES Ir. Assoc. Prof. Dr Wong Yew Hoong WAKIL MULTIMEDIA DAN ICT / ICT AND MULTIMEDIA REPRESENTATIVE

Ir. Jeewa Vengadasalam WAKIL JURUTERA WANITA / WOMEN ENGINEERS REPRESENTATIVE Ir. Noorfaizah bt Hamzah

AKIL BAHAGIAN JURUTERA SISWAZAH / YOUNG ENGINEERS SECTION REPRESENTATIVES Mr. Muhammad Ashiq Marecan bin Hamid Marecan, Mr. Lim Yiren, Mr. Darshan Balasubramaniam, Ms. Ong Ye Shian, Mr. Ooi Wei Chien, Mr. Naveen Kumar a/l Apparao, Ms. Anis Akilah bt Ameer Ali

Ir. Dr Chan Swee Huat, Ir. Ellias bin Saidin, Ir. Mohd Radzi bin Salleh, Dato' Ir. Hj Anuar bin Yahya, Ir. Dr Teo Fang Yenn, Ir. Sundraraj A. Krishnasamy, Ir. Dr Siti Hawa bt. Hamzah, Ir. Assoc. Prof. Lee Tin Sin, Ir. Mah Way Sheng, Ir. Sreedaran Raman, Ir. Lee Cheng Pay, Ir. Dr Kannan a/I M. Munisamy, Ir. Dr Siow Chun Lim, Ir. Wong Chee Fui, Ir. Dr Hum Yan Chai, Ir. Tiong Ngo Pu, Ir. Rusnida binti Talib, Ir. Prof. Dr Lau Hieng Ho, Ir. Muhammad Azmi bin Ayub, Ir. Fam Yew Hin, Ir. Razmahwata bin Mohd Razalli, Ir. Simon Yeong Chin Chow, Ir. Dr Chan Seong Phun, Ir. Yam Teong Sian, Ir. Kwok Yew Hoe, Ir. Dr Lee Choo Yong

#### AHLI MAILIS / CIL MEMBERS BY INVITAT

Ir. Lai Sze Ching, YBhg. Dato' Prof. Ir. Dr Mohd Hamdi bin Abd Shukor, YBhg. Dato' Ir. Nor Hisham bin Mohd Ghazali

WANGAN / BRANCH CHAIRMAN

- Pulau Pinang: Ir. Bernard Lim Kee Weng
- 2. 3.
- Selatan: Ir. Thayala Rajah s/o Selvaduray Perak: Y.Bhg. Dato' Sri Ir. Liew Mun Hon Kedah-Perlis: Ir. Roshasmawi bin Abdul Wahab
- Negeri Sembilan: Ir. Shahrin bin Amri Kelantan: Ir. Nik Ab. Hadi bin Hassan
- 5. 6. 7. Terengganu: YBhg. Dato' Ir. Wan Nazari bin Wan Jusoh
- Melaka: Ir. Ong Yee Pinn
   Sarawak: Y.Bhg. Dato' Ir. Janang Anak Bongsu
   Sabah: Ir. Willy Chin Tet Fu
   Miri: Ir. Chong Boon Hui

# 12. Pahang: Ir. Ab Rahman bin Hashim AHLI JAWATANKUASA INFORMASI DAN PENERBITAN/ STANDING COMMITTEE ON INFORMATION AND PUBLICATIONS 2022/2023

Pengerusi/Chairman: Ir. Abdul Razak bin Yakob Naib Pengerusi/Vice Chairman: Ir. Wong Chee Fui Setiausaha/Secretary: Ir. Dr Hum Yan Chai Ketua Pengarang/Chief Editor: Ir. Abdul Razak bin Yakob Pengarang Prinsipal Buletin/ Principal Bulletin Editor: Ir. Dr Siow Chun Lim Pengarang Prinsipal Jurnal/Principal Journal Editor: Ir. Dr Teo Fang Yenn Pengerusi Perpustakaan/Library Chairman: Ir. Dr Kannan a/I M.Munisamy Ahli-Ahli/Committee Members: Ir. Dr Bhuvendhraa Rudrusamy, Ir. Ong Guan Hock, Ir. Lau Tai Onn, Ir. Dr Oh Seong Por, Ir. Yee Thien Seng, Dr Sudharshan N. Raman, Ir. Dr Lai Khin Wee, Ir. Dr Lee Tin Sin, Ir. Yap Soon Hoe, Mr. Alex Looi Tink Huey, Dr Mohamad Shakri bin Mohmad Shariff, Ir. Mohd Razmi Ziqri bin Ahmad Shukri, Ir. Dr Siti Hawa Hamzah, Tr. Lee Chang Quan, Ms. Michelle Lau Chui Chui, Ir. Jeewa S/O Vengadasalam, Ir. Rusnida binti Talib, Ir. Dr Lee Choo Yong, Ir. Ts. Dr Tan Kim Seah, Mr. Muhd Ashiq Marecan bin Hamid Marecan

#### NG/EDITORIAL BOARD 2022

Ketua Pengarang/Chief Editor: Ir. Abdul Razak bin Yakob Pengarang Prinsipal Buletin/ Principal Bulletin Editor: Ir. Dr Siow Chun Lim Pengarang Prinsipal Jurnal/Principal Journal Editor: Ir. Dr Teo Fang Yenn Ahli-ahli/Committee Members: Ir. Lau Tai Onn, Ir. Ong Guan Hock, Ir. Yee Thien Seng, Ir. Dr Oh Seong Por, Dr Sudharshan N. Raman, Ir. Dr Lai Khin Wee Secretariat: Janet Lim, Nur Illyarnie bte Rosman

#### THE INSTITUTION OF ENGINEERS, MALAYSIA

Bangunan Ingenieur, Lots 60 & 62, Jalan 52/4, P.O. Box 223, (Jalan Sultan), 46720 Petaling Jaya, Selangor Darul Ehsan. Tel: 603-7968 4001/4002 Fax: 603-7957 7678 E-mail: sec@iem.org.my Homepage: http://www.myiem.org.my

# Contents

Cover Note	05
& Editor's Note	

#### **Cover Story**

Sustainability of Urban Development

#### **Features**

16 - 32

06 - 12

Sustainable Urban Scale Planning: Consideration of Weather & Air Ouality

Sustainability of Urban Development: Case Study in TRX Master Planning – from Concept to Reality

OSHCIM Guidelines: 5 Main Elements to Good **Management Practices** 

#### 35 - 40

Technical Site Visit to TRX Wastewater Treatment Plant Designed by Veolia Water Technologies

.....

Urban Flash Flood Prediction with New Curve Number Methodology

#### 41 **Engineer's Adventures**

Trekking the Tracks

Forums

<b>D:</b> 1 D	42
Pink Page	
	12 - 11

**Blue Page** 

# Advertise with us!













THE MONTHLY BULLETIN OF THE INSTITUTION OF ENGINEERS, MALAYSIA



**M**IEM





For advertisement placements and subscriptions, please contact:

Dimension Publishing Sdn. Bhd. [199701034233 (449732-T)] 🕲 +603-7493 1049 💿 info@dimensionpublishing.com



DIMENSION PUBLISHING SDN. BHD. [199701034233 (449732-T)] Level 18-01-02, PJX-HM Shah Tower, No. 16A, Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia. Tel: +(603) 7493 1049 Fax: +(603) 7493 1047 E-mail: info@dimensionpublishing.com Website: www.dimensionpublishing.com

> CHAIRMAN ROBERT MEBRUER

**CEO/PUBLISHER** PATRICK LEUNG

**GENERAL MANAGER SHIRLEY THAM** • *shirley@dimensionpublishing.com* 

**HEAD OF MARKETING & BUSINESS DEVELOPMENT** JOSEPH HOW • joseph@dimensionpublishing.com

**PRODUCTION EDITOR** TAN BEE HONG • bee@dimensionpublishing.com

**CONTRIBUTING WRITERS** PUTRI ZANINA • putri@dimensionpublishing.com HANNA SHEIKH MOKHTAR • hanna@dimensionpublishing.com

> SENIOR GRAPHIC DESIGNER **SOFIA HANIS** • *sofia@dimensionpublishing.com*

**GRAPHIC DESIGNER NICOLE THENG** • *nicole@dimensionpublishing.com* 

**ADVERTISING CONSULTANTS** THAM CHOON KIT • ckit@dimensionpublishing.com

ACCOUNTS CUM ADMIN EXECUTIVE YEN YIN • yenyin@dimensionpublishing.com

For advertisement placements and subscriptions, please contact:

DIMENSION PUBLISHING SDN. BHD. [199701034233 (449732-T)] Level 18-01-02, PJX-HM Shah Tower, No.16A, Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia. Tel: +(603) 7493 1049 Fax: +(603) 7493 1047 E-mail: info@dimensionpublishing.com

> **Subscription Department** E-mail: info@dimensionpublishing.com

JURUTERA is published and printed monthly by Dimension Publishing Sdn. Bhd.

#### JURUTERA MONTHLY CIRCULATION: OVER 50,000 MEMBERS

Submission or placement of articles in JURUTERA could be made to the:-Chief Editor Bangunan Ingenieur, Lots 60 & 62, Jalan 52/4, P.O. Box 223 (Jalan Sultan), Tel: +(603) 7968 4001/4002 Fax: +(603) 7957 7678 E-mail: pub@iem.org.my or sec@iem.org.my IEM Website: http://www.myiem.org.my

© 2020, The Institution of Engineers, Malaysia (IEM) and Dimension Publishing Sdn. Bhd.

#### PUBLICATION DISCLAIMER

care and they disclaim any duty to investigate any products, process, services, designs and the like which may be described in this publication. The appearance of any information in this publication does not necessarily constitute endorsement by IEM and Dimension. There is no guarantee that the information in this publication is free from errors. IEM and Dimension ent or the opinion expresssed in this publication.

COPYRIGHT JURUTERA Bulletin of IEM is the official magazine of The Institution of Engineers, Malaysia (IEM) and is published by Dimension Publishing Sdn. Bhd. The Institution and the Publisher retain the copyright over all materials

No part of this magazine may be reproduced and transmitted in any form or stored in any retrieval system of any nature without the prior written permission of IEM and the Publisher.



by Ir. Azhar bin Azmi Chairman, IEM Urban Engineering Special Interest Group

## **COVER** — NOTE

#### **Sustainability of Urban Development**

hat kind of place would you find ideal to live in? One that is comfortable to reside in, one that is convenient for work and leisure, one that has a safe and healthy environment or one that is productive and affordable.

The theme for the April issue of JURUTERA,

Sustainability of Urban Developments, encapsulates all these needs and concerns. In this issue, the government's point of view on the subject is discussed, including the policy of Sustainability Malaysia 2030 and the plan to achieve this goal.

Research and studies to address urban sustainability problems should be at the forefront of achieving the goals. We share the studies on Sustainable Urban-scale Planning which emphasise the need to address the weather and air quality impacts. With frequent urban flash flood occurrences becoming a critical issue, research on Urban Flash Flood Prediction proposes a new approach to predicting flash floods to account for the amount of runoff.

Private sector involvement is important to incorporate urban sustainable development in products and services. We share the developer's perspective using an actual case study and explore related facilities such as water treatment plants which are important to public health and sustainability.

Organisations at all levels as well as individuals have a role in ensuring the sustainability of our cities, towns and villages as these are where we live in and so, should be responsible for.

## **EDITOR'S** NOTE -

#### **Engineering Sustainable Urbanisation**

ike it or not, we are getting more urbanised, especially in a developing nation such as Malaysia. While urbanisation is widely equated to uplifting the quality of human life, we have to ensure that such development is taking shape in a sustainable manner.

While we cannot directly attribute the aggressive flash floods which are hitting us in the East Coast all the way to the south, to urbanisation, we as engineers have to be ever more cautious in planning and executing the various



developments which translate to sustainable urbanisation.

In this April issue, the Urban Engineering Special Interest Group brings us a compilation of articles deliberating on the issue of sustainable urbanisation.

As I am penning this note, the familiar voice whispering reminders of Yusof Taiyoob is playing repeatedly in my mind. This means Hari Raya is around the corner. To our Muslim readers, Selamat Hari Raya Aidilfitri!





# Sustainability of Urban Development



Under Sustainable Malaysia 2030, the Ministry of Natural Resources, Environment & Climate Change (NRECC) has listed 4 thrusts and 35 initiatives in the Environmental Sustainability in Malaysia 2020-2030 Plan, such as air quality, sewerage system, flood risk management, low carbon cities, low carbon mobility, etc. Its Minister, **YB Tuan Nik Nazmi Nik Ahmad**, tells us more.

> Can urban sustainability help attain environmental sustainability in Malaysia? How important is this for the people's health, mental wellbeing and hygiene?

> **Nik Nazmi:** According to the latest estimation from the Department of Statistics Malaysia (DOSM), 75% of our total population live in urban areas. It is estimated that this figure will rapidly increase to 85% by 2040. In fact, Malaysia's current urbanisation rate is among the highest in South-East Asia.

> This high urbanisation rate poses challenges in the form of poor air and water quality, water supply disruptions, inadequate sanitation, inefficient waste management and high energy consumption. The higher consumption in the urban areas has naturally resulted in a higher amount of emission and waste and this is a clear threat to the environment.

> Environmental sustainability is about meeting the needs of the present without compromising

the ability of future generations to meet their own needs. Thus, should Malaysia's urbanisation rate be on track as estimated, there is no other way to secure the future than to strive for urban sustainability.

Aside from the current initiatives taken by the Ministry, smart and green designs, technologies and solutions in sustainable cities may be key to environmental sustainability in Malaysia. Urban development must consider innovative approaches and solutions as the means to mitigate and adapt to the environmental threat and climate change impact.

Today's urban dwellers are already exposed to higher risks of morbidity, mortality and reduced well-being. This is where sustainability becomes paramount. Achieving urban sustainability is not only limited to reducing environmental impact but it's also through the promotion of physical and psychological wellbeing and healthy communities.

#### Nik Nazmi Nik Ahmad Minister of Natural Resou he has also served as the

Minister of Natural Resources, Environment and Climate Change, he has also served as the MP for Setiawangsa since 2018 and as a Vice-President of KEADILAN.

Nik Nazmi studied at the Malay College Kuala Kangsar and read law at King's College London. He was elected to the Selangor State Legislative Assembly in 2008, having won the Seri Setia constituency and was the youngest successful candidate.

*Re-elected to Seri Setia in 2013, he was appointed as a Deputy Speaker and he then held the position of Selangor's EXCO for Education, Human Capital Development, Science, Technology and Innovation.* 



Tell us about the main focus of the Environmental Sustainability in Malaysia 2020-2030 Plan agenda concerning urban sustainability. What is the set target for 2030?

*Nik Nazmi:* The urban sustainability aspiration involves cross-ministerial collaboration and effort. NRECC works closely with other ministries and government agencies, primarily the Ministry of Local Government Development, to implement initiatives under the portfolio of each organisation.

From 2020 to 2023, the main focus of NRECC's Environmental Sustainability Plan concerning urban sustainability is water supply and sewerage services, flood risk management, carbon emission and green growth.

As for water resources, the Ministry is targeting an increase of 25% in clean rivers by 2030, compared to 2020. On the National River Trail, this initiative, among others, is to ensure the sustainability and beauty of rivers while controlling river pollution activities and stimulating economic activities such as river ecotourism. The Ministry is targeting 10,000km of river trail by 2030, compared to 787.3km in 2022.

By 2030, the Ministry aims to increase 95% connection to sewerage services for domestic households in 11 major cities as well as to increase public health protection and to promote environment and water source sustainability.

To ensure improved air quality, NRECC aims to reduce the concentration of PM2.5 (μg/m3) pollutants in ambient air to 5% by 2030, compared to the concentration of pollutants in 2020.

Considering the need to balance economic growth with environmental protection, the implementation of the country's Roadmap Towards Zero Single-Use Plastics and Plastics Sustainability Roadmap will tackle plastic waste pollution both on land and in the sea.

Through these roadmaps, the Ministry will divert plastic waste from landfills and reduce land-based plastic pollution in the environment and marine ecosystems as well as implement mandatory extended producer responsibility to transition towards a circular plastic economy by 2030.

Apart from this, NRECC, through the Malaysian Green Technology & Climate Change Corporation (MGTC), has executed strategies to transform our cities into low carbon cities under the Low Carbon Cities Framework. The Ministry's target is 200 low carbon cities by 2030, compared to 34 in 2022.

The Ministry is also looking at the number of Electric Vehicle Charging Stations (AC and DC charges). Low Carbon Mobility Blueprint (LCMB) 2021-2030 will assess the best options in energy and greenhouse gases (GHG) mitigation planning in the transport sector, in particular land transport, using scenario analyses of a businessas-usual case and similarly for 2030.

## What are the contributions and achievements made to date?

**Nik Nazmi:** Cities are the main engines for dynamic economic growth and the focal points of most of the population. However, the process of urbanisation has contributed significantly to the increase in GHG emissions. So, fostering urban development in the most sustainable manner can help reduce energy demand, consumption and GHG emissions.

For this reason, the Ministry has developed roadmaps and blueprints towards environment sustainability, including that for urban sustainability. The Low Carbon Mobility Blueprint was developed in 2021 with the aim to reduce total primary energy supply and consumption as well as GHG in the transport sector, particularly land transport, by 2030.

The National Low Carbon Cities Framework 2017 (LCCF) was also developed to transform our cities into low carbon cities while pushing the low carbon development in Malaysia to the next level. The targeted outcome includes GHG emission reduction at cities/municipal level.





# **SIMPRO**<sup>®</sup>

## **SEL-751** Feeder Protection Relay *with Touchscreen*



Folders and applications provide quick access to bay screens, metering and monitoring data, reports, settings, and more.

The SEL-751 Relay's 5-inch, 800 x 480 color touchscreen display provides a one-line diagram mimic display for bay control and monitoring. View metered quantities, phasor diagrams, relay settings, event summaries, target statues, and Sequential Events Recorder (SER) data.

#### **Bay Screens and Bay Control**

Select from predefined bay screens, or configure your own bay screens using the AcSELERATOR<sup>®</sup> Bay Screen Builder SEL-5036 Software and AcSELERATOR QuickSet<sup>®</sup> SEL-5030 Software. Control a single breaker, monitor as many as five disconnect switches, and view analog and digital data in a contextual display.

To control a breaker, simply tap the Bay Screens application on the home screen and then the breaker you want to adjust on the bay screen.



#### Meter Phasors

View a graphical and textual representation of the real-time voltages and currents in a power system during balanced and unbalanced conditions. Analyze the phasors to determine power system conditions.



#### **Feeder Protection**

Protect radial and looped distribution circuits with comprehensive protection capabilities, including time overcurrent, directional overcurrent, autoreclosing, over-/undervoltage, frequency, cable thermal, and more.

Exclusive Distributor For Schweitzer Engineering Laboratories, Inc., U.S.A.SIMPRO ENGINEERING SDN. BHD. 199701015320 (430817-D)58, Plaza Puchong, Jalan Puchong Mesra 1, 58200 Kuala Lumpur, Malaysia.\$\$\mathbf{C}\$+603 8075 2801\$\$\mathbf{M}\$ info@simpro.com.my\$\$\mathbf{W}\$ www.simpro.com.my





Malaysia's Roadmap Towards Zero Single-Use Plastics 2018-2030 was introduced as a policy guide for all stakeholders to take a uniform and holistic approach to the plastics value chain in addressing singleuse plastics pollution in Malaysia. The action plans were designed taking into consideration the need to balance economic growth with environmental protection.

This roadmap focuses on not only advocating sustainable practices among Malaysians by introducing pollution charges on plastic bags but also on the industry transition from a linear business to a circular economy business model. The outcome includes plastic waste diversion from landfills and land-based plastic pollution in the environment and marine ecosystem.

To support the plan, NRECC also launched the Plastics Sustainability Roadmap in December 2021, which will shift the plastics industry from a linear business model to a more sustainable circular ecosystem. This new ecosystem will cover a whole range of elements, from design innovation, supply chain collaboration, high value recycling industry and resource efficiency to the accountability of manufacturers and brand owners in managing endof-life impacts of their products to ensure the circularity of the plastic value chain.

#### Compare and contrast what Malaysia has done with that of other developing countries.

**Nik Nazmi:** Developing countries are bearing the brunt of climate change and environmental decline. Malaysia shares almost similar environmental challenges with other developing countries, especially those in the South-East Asian region, such as rising temperatures, increase in rainfall intensity and duration to severe floods and threats to biodiversity.

Over the years, ASEAN has demonstrated its commitment to addressing climate change, including through multi-sectoral dialogue and relevant activities involving key partners in various sectors, such as agriculture, forestry, energy, transport, disaster management and finance.

In terms of climate ambition, the world had pledged to keep global warming to below 1.5°C, as defined in the 2015 Paris Agreement. Malaysia joined the increasing number of developed countries in the net zero emission pledge by 2050.

Almost all members of ASEAN have pledged to attain net zero

emissions. Of the 10 ASEAN member countries, 8 have announced national targets to achieving net-zero GHG emissions or to become carbon neutral by 2050, corresponding to the 1.5°C target set by the Intergovernmental Panel on Climate Change (IPCC). The 2 exceptions are Indonesia, which has committed to net zero by 2060 while The Philippines is the only ASEAN country yet to commit to a net-zero target.

Indonesia's policy makers have set targets to embrace clean energy on its way to achieving net zero emissions by 2060. Thailand has committed to reach carbon neutrality by 2050 and net zero GHG emissions by 2065. Thailand also pledged to enhance the Nationally Determined Contributions (NDCs) to reduce GHG emissions by 30%-40% in 2030 from its previous target of 20- 25%, in order to attain carbon neutrality and net zero goals.

Malaysia has focused its efforts on moving towards a green economy and working closely with businesses in low carbon strategies. We have taken a step ahead in climate action through the launch of Bursa Carbon Exchange (BCX) on 9 December 2022. This is a voluntary carbon market and the world's first syariahcompliant carbon exchange. Such a carbon market mechanism is relatively new among developing countries, especially in the South-East Asia. This initiative is pivotal in facilitating businesses in transitioning to a green economy and meeting global standards for a sustainable supply chain.

Water resources management is one of the challenging areas for developing countries. Malaysia is working on strategies to increase efficiency in managing water resources through river clean-up initiatives, increasing water resources margin reserves, establishing an integrated river basin management plan and water resources/water supply-related research.

A similarity in water resources management actions can be

observed in two of our neighbouring countries, Thailand and Indonesia. An approach shared by Malaysia and other developing countries in this area is cooperation with developed countries and nonprofit organisations in adopting mechanisms and solutions in river clean-up.

One of the biggest environmental threats the world is facing is pollution from waste mismanagement, including plastics. In terms of a national action plan to address this issue, Malaysia is leading the way with our roadmaps and blueprints on plastic sustainability. To date, developing countries such as Myanmar, Thailand and Indonesia have also established roadmaps with strategies tailored to their country's circumstances.

Malaysia has forged cooperation with other member countries to combat pollution, including that from plastic waste under the ASEAN Regional Action Plan for Combating Marine Debris.

Regardless of national circumstances and level of readiness, Malaysia is also actively cooperating with other developing countries, especially those in the ASEAN region, to address environmental threats and to tackle climate change.

#### Speaking of the recent threat to the urban livelihood, which is flooding, what are the plans and status of preparedness by NRECC or other government agencies to prevent this?

Nik Nazmi: NRECC is always ready and working to improve weaknesses that have been identified to ensure such situations do not recur. The government is implementing action plans, including drainage maintenance works through its Integrated Flood Management approach, developing structures and designs based on the "make room for water" concept such as upgrading the flood management system, beaches and main rivers as well as increasing

the level of protection in the design of drainage infrastructure.

The government strives to reduce the risk of flooding throughout the country with the implementation of the Flood Mitigation Plan (Rancangan Tebatan Banjir or RTB). To date, there have been as many as 40 various projects related to flood mitigation and environmentally friendly drainage. The implementation of RTB projects means more residents will be protected from the effects of floods.

Through the Department of Irrigation & Drainage (JPS) and the Department of Environment (DOE), NRECC has taken the following steps to ensure that rivers are not polluted:

- 1. Implementing an Integrated River Basin Management (IRBM) approach. This requires the involvement of all stakeholders to prevent pollution incidents, ensure clean and sufficient water sources, reduce the risk of flooding and improve environmental conservation. The IRBM plan also offers recommendations to state governments on how to deal with strategic issues in order to be in line with the goal of environmental sustainability.
- 2. Implementing the National River Trail Development Programme (DSK), a Nature-Based-Solutions (NBS) approach to dealing

with illegal waste disposal. The programme increases public awareness of the beauty of rivers and increases the number of visitors to the riverside for leisure activities which, in turn, can indirectly prevent illegal waste disposal activities.

- 3. Enhancing the enforcement of AKAS (Akta Kualiti Alam Sekeliling) 1974 and the regulations under it through periodic monitoring and inspection of premises located upstream of water sources which produce waste such as effluents, toxic and hazardous waste. This is done through integrated operations involving various enforcement agencies on identified causes.
- 4. Carrying out special operations such as enforcement programmes focusing on specific sources of pollution, specific sectors or types of industries, specific areas or hot spots which have risks of causing pollution. In addition, monitoring through patrols and drones in areas at risk of pollution is also enhanced.
- 5. Taking firm legal action against non-compliance detected during enforcement investigations.
- 6. Implementing awareness programmes for the general public, those who may be the



sources of pollution such as industries and development project developers, to increase their level of awareness on the importance of protecting the environment and water resources.

7. Preparing an Environmentally Friendly Drainage Master Plan for major cities to be used as a guide and reference for the upgrading and building of drainage systems as well as planning future development that is more systematic and sustainable to reduce the risk of flash floods and to control pollution due to development.

#### Who are the stakeholders?

**Nik Nazmi:** Stakeholders involve many parties, including the local community, the public, traders, property owners, government agencies, security forces, NGOs and others. The cooperation of all parties is very important to ensure we can overcome the flood issue together. It starts with the public not throwing garbage into rivers as this is a main cause of flash floods.

For new development in any particular area, the developer must comply with all the guidelines and development acts set by the government, especially the local authorities and JPS, which cover planning permission, compliance with the requirements and conditions of the Erosion & Sediment Control Plan (ESCP) as outlined in the Urban Stormwater Management Manual (MSMA) and so on.

For agencies directly involved in flood management, JPS has taken into account the IRBM and Integrated Flood Management (IFM) approaches in flood management plans. The approach will use strategies and programmes designed for and to be implemented efficiently and effectively by combining structural methods, non-structural methods and post-disaster activities in managing and controlling floods to ensure minimal negative impact on the public.

The involvement of stakeholders in preventing floods and the role of communities in preparing for floods are important to reduce the loss of lives and damage to property so that social and economic activities can continue for the well-being of the people.

## *Is a change in mindset required of Malaysians?*

**Nik Nazmi:** One of the main causes of flooding in Malaysia is the problem of uncontrolled garbage dumping as this will block drainage systems and obstruct the water flow in rivers, resulting in flooding. Therefore, all citizens need to change to a first-class mentality, one that is responsible, ethical, progressive and has a high awareness of cleanliness, the beauty of the environment and environmental sustainability. The cooperation of all parties is essential in the effort to realise this.

The Ministry has launched the National River Trail Programme with objectives that include ensuring the sustainability and beauty of rivers while controlling activities that can cause river pollution. The existence of trails by the river will encourage leisure activities such as jogging, picnicking, fishing and cycling. The presence of people in the area will deter irresponsible parties from turning the river into a dumping ground for rubbish, while potentially contributing to eco-tourism.

#### What does the future hold?

*Nik Nazmi:* Climate variability has increased the frequency of severe floods and prolonged drought periods in Malaysia. To maintain longterm viability, the Ministry's strategic planning targets development through the concept of creating resilience. This concept can integrate the elements of land use planning, development and management of water resources through the Urban Stormwater Management Manual (MSMA), Sustainable Drainage Master Plan (PISMA), Integrated River Basin Management (IRBM) Plan, Flood Risk Map, Flood Hazard Map and the Integrated Coastal Management Plan.

The IRBM Plan is supported by the Urban Stormwater Management Manual and focuses on potential flooding by providing technical guidelines pertaining to drainage and water quality control. The preparation of Stormwater Management Plans is another initiative to assist local authorities in their efforts to provide basic drainage and stormwater management infrastructure.

PISMA identifies low-lying areas, flood prone areas and proposes stormwater infrastructure implementation; the Integrated Flood Management (IFM) plan has been adopted for efficient use of flood plains to minimise loss of life and property. This approach integrates both structural and non-structural measures. Structural measures, which involve flood mitigation projects, will help to significantly reduce the risk of flooding and directly benefit millions of people living in the flood plains.

Meanwhile, non-structural approaches involving Flood Hazard Maps and Flood Risk Maps have been developed to identify high-risk, flood-prone areas requiring flood mitigation. This information also serves as a guide in the planning and execution of future development and for disaster management by related agencies.

Even though the plans have been tabled and implemented, the government continues to look for ways to improve flood mitigation and adaptation methods. It is a continuous effort, one that should be reviewed occasionally.



# **ATOM SERIES MINI VRF**

EFFECTIVE CONTROL IN HIGH-EFFICIENT OFFICE













**Cloud Control** 



Long Piping Capability for **Flexible Installation** 

Sole Distributor:

Midea Scott & English Electronics Sdn Bhd (194517-X)

No. 16, Jalan Chan Sow Lin, 55200 Kuala Lumpur Tel: 03-9221 1033 • PENANG No. 35, Jalan Perniagaan Gemilang 1, Pusat Perniagaan Gemilang, 14000 Bukit Mertajam, Pulau Pinang. Tel: 04-548 3938 Fax: 04-548 9698 • JOHOR No. 25, Jalan Seri Impian 1, Taman Impian Emas, 81300 Skudai, Johor. Tel: 07-562 4898 Fax: 07-557 7898

PARAN NG 22, Jaan Seri mipani r, aniani mipani r, aniani mayani runs, souca, souca, etc. 2010, 2024, 303 ratio, 01-301 ratio, 01-



🚟 🚮 Midea Malaysia



### Fax: 03-9221 7204 / 03-9221 1434 / 03-9221 3509 • MALACCA No. 385-L, Taman Peringgit Jaya, 75400 Peringgit, Melaka. Tel: 06-292 1940 Fax: 06-286 7107

- KOTA BHARU PT 1436, Ground Floor, Taman Koperatif, Tanjung Chat, 15300 Kota Bharu, Kelantan. Tel/Fax: 09–743 1202 SABAH Inanam Suria Commercial Centre, Lot B, Unit (-9, Unit 1-9, Ground Floor and First Floor, 88450, Kota Kinabalu, Sabah. Tel: 088-421 428 Fax: 088-431 427
   SARAWAK 1st Floor, Lot 8517, Studong Commercial Centre, Jalan Stutong, 93350 Kuching, Sarawak. Tel: 082-363 167 Fax: 082-365 167

📱 midea.com/my



THE MONTHLY BULLETIN OF THE INSTITUTION OF ENGINEERS, MALAYSIA For advertising enquiries, please contact:

JURUTERA

MEN

**MEM** 

INNOVATIONS

PALM OIL INDUSTRY



JANUARY 2020

#### **Dimension Publishing Sdn. Bhd.**

[199701034233 (449732-T)]



Level 18-01-02, PJX-HM Shah Tower, No. 16A, Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia.

Joseph How : +6011 1234 8181 Shirley Tham : +6016 283 3013



( +603 7493 1049

+603 7493 1047

JURUTERA

Fire Safety Management

TURUTIERA

info@dimensionpublishing.com

# JURUTERA

#### **Circulation and Readership Profile**

JURUTERA has an estimated readership of 200,000 professionals. Our esteemed readership consists of certified engineers, decision making corporate leaders, CEOs, government officials, project directors, entrepreneurs, project consultants, engineering consulting firms and companies involved with engineering products and services.

#### **Advertising Benefits**

Our business partners can be assured that their products and services will be given the circulation and exposure they deserve, thus maintaining a sustained advertising presence to our core readers of decision-making engineers and technical experts. Our website offers an even wider market reach, with added international presence, aided by our international affiliation with official engineering bodies all over the world. Our online and offline advertising features such as banner advertising, article sponsorship and direct e-mail announcements have proven to be successful marketing strategies that will set the businesses of our partners apart from their competition.

# **ADVERTISING RATES**

	PRICES PER INSERTION IN RINGGIT MALAYSIA (RM)				
SPECIFIED POSITION (Full Colour Ad)	1 INSERTION	<b>3 INSERTIONS</b>	6 INSERTIONS	9 INSERTIONS	12 INSERTIONS
Outside Back Cover (OBC)	7,800	7,050	6,750	6,450	6,150
Inside Front Cover (IFC)	7,250	6,650	6,350	6,050	5,750
Inside Back Cover (IBC)	6,750	6,250	5,950	5,650	5,350
Page 1	6,650	6,150	5,850	5,550	5,250
Facing Inside Back Cover (FIBC)	6,150	5,850	5,550	5,250	4,950
Facing Cover Note (FCN)	5,850	5,300	5,100	4,900	4,700
Facing Contents Page (FCP)	5,700	5,150	4,950	4,750	4,550
Centre Spread	11,200	9,500	9,000	8,500	8,000
ROP Full Page	4,900	4,500	4,300	4,100	3,900
ROP Half Page	2,900	2,650	2,550	2,450	2,350
ROP 1/3 Column	2,200	2,000	1,900	1,850	1,800
ROP 1/4 Page	1,950	1,750	1,650	1,600	1,550

Special Position: +15%

Overseas Advertiser: +25% (Full Advance Payment Required) All prices shown above exclude Computer to Plate (CTP) charges \*Please note that the above prices will be subjected to SST

\*Advertising rates displayed do not include 15% advertising agency commission

# Sustainable Urban Scale Planning: Consideration of Weather & Air Quality

#### Written and Prepared by:



#### Dr Maggie Ooi Chel Gee

A research fellow under the Institute of Climate Change in Universiti Kebangsaan Malaysia (UKM), is actively involved in weather and air quality research.



#### Ir. Dr Wang Hong Kok

*IEM Vice President (2019/2021), a property development veteran who, to his credit, has turned around 3 property companies.* 

n cities, natural resources are often compromised for social foundation to accommodate the large population. Economically growth-driven cities are often perceived as populated, congested, and polluted but it does not stop there. The population in urban areas continues to grow, sprawling into greater conglomerations. Are current cities, with their resources, capable of supporting the growing population and, at the same time, maintaining the quality of life?

A doughnut model (Figure 1) was proposed by British economist Kate Raworth[1] as a "regenerative and distributive" economic model that would strike a balance between natural resources and social requirements. It is a space that lies below the "ecological ceiling" where the natural ecosystem can still regenerate itself after



Figure 1: A regenerative and distributive economic model. Extracted from [1]

being utilised for development while above the "social foundation" where the human basic needs are met on energy, water, food, health, and all. Unlike the commonly known three pillars of sustainable development, namely economic, social and environmental, the model has laid these out into interconnected relationships with their implications if any of those have been neglected.

In early times, humans commonly settled in locations where the community had easy access to food and resources while at the same time, could protect themselves from enemies. The growth in population and industry within these locations, which later evolved into urbanised areas, made the community more vulnerable to environmental challenges. For example, human settlements were commonly located in basins or adjacent to mountains for defence purposes. Such sheltered terrain, however, was less conducive for the ventilation of the airflow and caused bad air quality[2]. In other words, with increased atmospheric pollutant emission from human activities in cities, it became more difficult for the pollutants to be dispersed and diluted. Another prominent location of human settlement was proximity to water bodies, which was convenient for access to food and water resources as well as transportation. However, this tended to expose dwellers to additional natural hazards such as flooding and tsunami. This article will scrutinise the environmental threat faced in Malaysia and its cities as well as potential solutions to it.

#### **Environmental Threats**

**Weather conditions:** While global climate change has become one of the big challenges now and in the future, Malaysia, a tropical country, is most prone to weather conditions related to temperature and moisture. As we experience warm temperature throughout the year, cold is

not a big problem as compared to high temperature (also known as extreme temperature) which has occurred in the country several times in history.

In 2015, when the extreme El-Niño Southern Oscillation (ENSO), a mesoscale hot and dry anomaly, struck, the temperature anomaly based on Oceanic Niño Index (ONI) was recorded at 2.6°C, while a typical ENSO is declared when the ONI is higher than 0.5°C. The weather anomaly also affected the moisture distribution in Malaysia. The persistent heat and dryness caused extreme fires to occur and deteriorated the regional air quality. Hence, the economy and public health were further affected.

Kuala Lumpur, the capital city, has extended to its adjacent state, Selangor. It is known as Klang Valley or Greater Kuala Lumpur and more recently, the Kuala Lumpur Extended Mega Urban Regions (KLEMUR) which includes the Negeri Sembilan state. Here onwards, we will use "Klang Valley" terms for urban agglomeration.

Klang Valley is located on the western side of the peninsula between the Straits of Malacca on the west and Titiwangsa Highland on the east (Figure 2). It is an example of the basin-like urban topography, not to mention the Barisan Mountains, Sumatra, further west. The urban heat island effect is a condition that occurs in developed cities where the temperature is higher compared to the rural regions. Although KLEMUR experiences a tropical climate, it is not exempt from the influence of urban heat islands.



Figure 2: Development on both sides of the Straits of Malacca. Extracted from [3]

Urban heat island formation is created by urban planning – paved roads and concrete jungles with materials that do not regulate heat and moisture unlike vegetation and natural surfaces. Conventional urban materials have either highly reflective solar radiation like glass and white surfaces which increase the ambient temperature or have high heat retention capability such as black and paved surfaces which increases surface temperature.

The country receives a large amount of rain throughout the year; however, the urban surface cannot absorb rainwater which will then directly run off to the nearest water body. In cases of thunderstorms, when the amount of runoff has exceeded the capacity of the drainage system, urban flooding will occur and while the moisture retained within the ground has reduced, there is more moisture available on the surface or water body to form water vapour under hot temperatures.



Figure 3: Modelling of sea-land breeze mechanism in October under the pre- and post-urbanisation scenarios for Klang Valley. "L" means low-pressure system induced by urban heating. Adopted from [4]



We are a supplier of high quality geosynthetic products used for soft soil stabilization, slope reinforcement, coastal erosion protection, river bank protection, landfills, drainage, road and railway construction.

#### Our products:

- NEXTILE NON-WOVENS
- NEXTFORCE HIGH-STRENGTH WOVENS
- NEXGRID GEOGRIDS

We also provide design, specification, bill of quantities, cost estimate and drawings free-of-charge.



Road Construction





Drainage

Soft-soil Stabilization





For further information on our range of geosynthetics products, please contact:

#### Nehemiah Geosynthetics Sdn Bhd



# Print Service Special romotion

## Flyer / Leaflet Art Paper (Full Color)



All and a second	and the second	
44	<b>105gsm</b> 500pcs	RM130
	1000pcs	RM 160
	128gsm	400
19. S	500pcs	rm160
	1000pcs	RM190
۸ <i>Б</i>	105 <b>as</b> m	
43	500pcs	RM100
1 - E	1000pcs	км130
	128gsm	
		400
	500pcs	RM130

- Annual Reports
- Booklets
- Brochures
- Buntings
- Business Cards
- CD / DVD Replications
- Calendars
- Cards & Invitations
- Certificates
- Custom Printings
- Envelopes
- Folders
- NCR Bill Books
- Notepads
- Leaflets
- Letterheads
- Paper Bags
- Posters
- Stickers
- Others



For other quantity and material, please contact:

Joseph How (+6) 011 1234 8181 Shirley Tham (+6) 016 283 3013 Research shows that the urban heat island effect increases Klang Valley temperatures by 0.9°C during the day and 1.9°C during the night[4]. Hot air rises, cold air sinks. When the hot air caused by urban heat islands rises, the air from the nearby regions will flow in to fill the void created. In the Klang Valley, the airmass from the Straits of Malacca matters. The formation of urban heat has influenced the sea-land breeze mechanism by increasing the wind flows and moisture influx near the coastal region (Figure 3) and moisture is, of course, a critical component for rain and thunderstorm to form.

**Deterioration of air quality:** In modern times, the urban cities have extended vertically to fit a high population into the limited land in city centres. The low sky view factor and narrow urban canopy reduce the ventilation rate within the buildings by slowing down the wind flow. Pollutants in the air, therefore, have a higher tendency to be trapped within the stagnant and narrow spaces where residents go about their daily chores or commute. It is notable to mention that Klang Valley is home to several large emission emitters such as industry clusters in Shah Alam, the port in Klang and international shipping lanes. The Straits of Malacca is one of the busiest arterial shipping lanes connecting the Indian Ocean and the Pacific Ocean (Figure 4).

In a period when the west coast of the peninsula experienced weak winds or weak wind vectors (for example on 16 February 2023), pollutants tended to accumulate. The primary air pollutant, nitrogen dioxide (NO<sub>2</sub>), was often considered one of the primary emitters from the sources.



Figure 4: Live Ship Traffic Density map of Straits of Malacca. Extracted from marinevesseltraffic.com on 16 February 2023



Figure 5: NO<sub>2</sub> concentration from CAMS air quality forecast model. Extracted from Windy.com on 16 February 2023

Figure 5 shows a higher value of  $NO_2$  over the west coast where Klang Valley is located. Weak lines of shipping lanes (over the South China Sea) are also visible in Figure 5, though it cannot be seen clearly over the Straits of Malacca due to a higher concentration of other emission sources.

The geographical condition has exposed Klang Valley to these environment threats. Climate change or weather condition is a natural stress test to the urban design, growth and evolution. However, not all environmental threats are caused by external factors. For example, urban heat islands and flash floods are distinct weather conditions observed over the region due to urbanisation. For the realisation of sustainable urban cities, proper assessment and planning that takes into consideration the vulnerability to climate and air quality factors as well as the urban designs which alleviate the urban climate condition are required.

**Sustainability indices:** The formal assessment available is the Environmental Impact Assessment (EIA) Guidelines released by the Department of Environment (DOE) Malaysia. Among the guidelines, the EIA on Housing, New Township and Industrial Estate Development advises that impact assessment be conducted up to 5km from the project boundary while the project developer can extend beyond to cover the determined zone of impact[5]. Some other indexes are used as guidelines to evaluate the sustainability level of development in Malaysia but these are still on a voluntary basis (Table 1).

The assessment and adoption of sustainability indices on a building scale have become more known and practised by industry players because they are mandatory or are being supported financially. For example, projects certified as green buildings can be entitled to green tax incentives schemes such as investment tax allowance and

Table 1: Sustainability indices developed and adopted in Malaysia. Extracted from [6]

Rating Tools	Developing Body	Applicability
Green Building Index (GBI)	PAM, ACEM	Non-residential buildings
Malaysia Carbon Reduction and Environmental Sustainability Tool (MyCREST)	JKR, CIDB	New Buildings
Malaysia Green Highway Index (myGHI)	JKR	Highways
Green road rating system (pHJKR)	LLM	Non-toll roads
Sustainable Infrastructure Rating Tool (Sustainable INFRASTAR)	CIDB	Infrastructures
Green Real Estate (GreenRE)	REHDA	Buildings, Townships, Infrastructures

PAM: Malaysian Institute of Architects. ACEM: Association of Consulting Engineers Malaysia. JKR: Public Work Department. CIDB: Construction Industry Development Board. LLM: Malaysia Highway Authority. REHDA: Real Estate & Housing Developers' Association Malaysia income tax exemption[7]. With the gradual maturity of the implementation of sustainable building, the subsequent work shall extend toward the urban and regional scale[6].

As mentioned earlier, the interaction of urban and climate is two-way: Climate influences the weather in urban areas while urban development itself also creates its own microclimate (small-scale climate conditions). A planning system that integrates all the urban-related information is necessary to understand the larger-scale problem such as weather. This is usually done through simulation software which inputs the information available such as land use, building geometry, building material, weather condition, etc to predict the spatiotemporal distribution of the heat, wind and other weather components. The urban climate modelling software is mainly built on the basis of computational fluid dynamics and can involve mesoscale processes like numerical weather prediction systems. The software is a more cost-effective approach to predicting the urban climate.

#### **Conclusion: Digital twins Concept**

The planning of sustainable city development can apply the concept of "digital twins" where a replica of the physical city is created digitally. It has been used in the development of smart cities where the pre-fabrication, design and process of construction are carefully designed and planned at the beginning stage. The application of urban planning will be able to predict the condition of the urban area under different development and climate change projections. With active monitoring sensors available, it is able to incorporate up-to-date datasets and solve other problems apart from the weather, such as air quality, traffic, building energy and others.

European countries have started to explore the potential of digital twins for urban areas[8] where there are traffic models, air quality models and noise models (Figure 6). As Singapore has followed suit, this can be a



Figure 6: Alpha version of Digital Urban European Twin (DUET) of Athens, Pilsen and Flanders [8]

good reference for Malaysia as Singapore experiences a similar tropical climate. Under the Cooling Singapore project, the government has started to develop the Digital Urban Climate Twins to predict and mitigate the urban heat issues in an effort to improve the dweller's outdoor thermal comfort and quality of life[9].

There is no one-size-fits-all solution. Such a planning tool is, of course, not an easy task to be applied as it may require huge amounts of heterogeneous local information on the urban designs or land use planning. It would a big leap ahead for the country if such a big amount of urban information is made available and can be utilised for data-driven decisions and planning for a better and more sustainable city for us to live in.

#### Note:

This paper was built on the foundation of [6] and permission had been obtained.

#### REFERENCES

- [1] Nugent, Ciara (2021) Amsterdam Is Embracing a Radical New Economic Theory to Help Save the Environment. Could It Also Replace Capitalism?. Time. https://time.com/5930093/amsterdamdoughnut-economics/?fbclid=IwAR3YjhzvbMRpMELb1VwwvJ79jZY W7\_4FQOCTrwAmeQ6VV9J9OZC-1VOJMJE [accessed on 26 Feb 2021]
- [2] Yang J et al (2021) Contribution of urban ventilation to the thermal environment and urban energy demand: Different climate background perspectives. Science of The Total Environment: 795: 148791. https:// doi.org/10.1016/j.scitotenv.2021.148791
- [3] Yang F et al (2020) Changes and Regional Differences in Urban Land Areas on Both Banks of the Strait of Malacca Based on Remote Sensing, Sustainability 2020, 12(22), 9714. https://doi.org/10.3390/ su12229714
- [4] Ooi MCG, Chan A, Subramaniam K, Morris KI, Oozeer MY. 2017. Interaction of urban heating and local winds during the calm intermonsoon seasons in the tropics. J Geophys Res Atmos 122: 1–25. doi: 10.1002/2017JD026690
- [5] DOE (2020) https://enviro2.doe.gov.my/ekmc/wp-content/ uploads/2021/09/GP-1-Housing-New-Township-Industrial-Estate.pdf
- [6] Ooi MCG and TS Yam (2022) Going Sustainable with Urban Environment Design, The Ingenieur: Magazine of the Board of Engineers Malaysia, 91: 6-13, KDN PP 11720/4/2013 (032270)
- [7] GreenRE (2020) Malaysia's Leading Green Building Certification Body. REHDA. Available online: https://greenre.org/ uploads/1/0/7/1/107142097/greenre\_corporate\_brochure\_2020-aug. pdf [accessed on 17 Feb 2023]
- [8] Raes et al (2021) DUET: A Framework for Building Interoperable and Trusted Digital Twins of Smart Cities. IEEE Internet Computing, 25 (3): 43-50. https://doi/org/10.1109/MIC.2021.3060962
- [9] National Research Foundation, Hot Tech to Keep Singapore Cool, Singapore Prime Minister's Office, Available online: https://www.nrf. gov.sg/features/features/page/0/hot-tech-to-keep-singapore-cool [accessed on 17 Feb 2023]

# Waterproofing Systems for Below-grade Structures

IDUPAN

Great Eastern

Purtop 1000 application at KVMRT Bukit Bintang





Follow us on social network

Pre-applied Membranes Mapeproof, Mapeproof Mastic, Mapeproof Seal, Mapeproof Swell, Polystick TU Plus, Mapeproof AL AP System

Mortars & Coatings Mapelastic Foundation

Injections Mapegel UTT System

Joint Sealing Idrostop Tuboflex, Idrostop SW Polyurea Membrane Purtop 1000



 Image: Content of the second system
 Image: Content of the second system

 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system

 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system

 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system

 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system

 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second system
 Image: Content of the second syst

# Sustainability of Urban Development: Case Study in TRX Master Planning – from Concept to Reality

#### Written and Prepared by:



#### Ir. Lau Eng Kee

Deputy Chairman of Urban Engineering Development Special Interest Group (UEDSIG) and Vice President of TRX City Sdn. Bhd.



#### Siti Khamizah Kholil

An associate supporting the Strategic Marketing & Communications Department in TRX City Sdn. Bhd.

he world is becoming increasingly urbanised. Since 2007, more than half the world's population live in cities and this number is projected to rise to 60% by 2030 (UN Sustainable Development Goals, Goal 11). Cities and metropolitan areas are powerhouses of economic growth, contributing about 60% of the global GDP. Rapid urbanisation has resulted in a growing number of slum dwellers, inadequate and overburdened infrastructure and services, such as waste collection and water-sanitation systems, roads and transport, worsening air pollution and unplanned urban sprawl.

Apart from increasing water needs from agriculture, industry and energy sectors, this rapid urban population growth has led to a bigger demand for water. In 2020, 74% of the global population had access to safely managed drinking water services, up from 70% in 2015. However, in 2020, there are still 2 billion people who live without safely managed drinking water services, including 1.2 billion who lack even the basic level of service (UN SDGs, Goal 6).

Between 2015 and 2020, the population with safely managed sanitation rose from 47% to 54% and the population with access to handwashing facilities with soap and water at home increased from 67% to 71%. Rates of progress for these basic services would need to quadruple for universal coverage to be reached by 2030 (UN SDGs, Goal 6).

At the current rate of progress, 1.6 billion people will lack safely managed drinking water, 2.8 billion will lack safely managed sanitation and 1.9 billion people will lack basic hand hygiene facilities in 2030 (UN SDGs, Goal 6).

Meanwhile, the increase in demand for energy is stimulated by economic growth and the accompanying trends of urbanisation, industrialisation, infrastructure growth and a growing global middle class. Carbon dioxide (CO<sub>2</sub>) emissions from fossil fuel use in the energy and industry sectors dominate total greenhouse gas (GHG) emissions. Following a period of stabilisation from 2014 to 2016, emissions started to rise again in 2017 and 2018. At the same time, energy needs are projected to grow by approximately 20% by 2040 (Lessons From a Decade of Emissions Gap Assessments, published by UN Environment Programme).

Global GHG emissions grew at an average 1.6% per year from 2008 to 2017, reaching a record 53.5 GtC0<sub>2</sub> in 2017, including emissions from land use change. Preliminary findings from the Emissions Gap Report 2019 indicated that global GHG emissions continued to grow in 2018, breaking the 2017 record (Lessons From a Decade of Emissions Gap Assessments, published by UN Environment Programme).

#### Site Overview of Tun Razak Exchange

The Tun Razak Exchange (TRX) is uniquely situated at the southern edge of Kuala Lumpur's City Centre and is adjacent to the Golden Triangle, the city's commercial, shopping and entertainment hub (Figure 1). At present, the area surrounding the site is dominated by low-rises and comprises mainly single storey or two-storey masonry buildings dating back to the mid-20th century.

#### **Master Plan Overview**

TRX is envisioned to be the International Financial Centre of Malaysia, encompassing 70 acres in the heart of Kuala Lumpur. With an estimated gross development value of RM40 billion, TRX is designed to be the city's new CBD. The Master Plan was designed with excellent connectivity by rail, road with links to main highways and by foot via an extensive network of pedestrian walkways. It features an iconic public realm that culminates in a 10-acre rooftop park.

Upon completion, TRX will have 30 buildings with a total 24 million sq ft of gross floor area made up of investment

grade A office space underpinned by world-class residential, hospitality, retail, leisure and cultural offerings (Table 1).



Figure 1: Site Overview

Table 1: Key project information (Master Builder Journal, Vol 1/2022#124)

Key Project Information			
Total Site Area (TSA)	70 acres		
Total Gross Floor Area (GFA)	24 million sq ft (50% offices, 30% residential, 10% hotel, 10% retail)		
Gross Development Value (GDV)	RM40 billion		
Site Floor Area Ratio (FAR)	7.8		
Number of Buildings	30		
Public Park and Open Spaces	23%		
Car Parks	21,500		
Typical Office Floor Plates	22,000 – 27,000 ft <sup>2</sup>		

With a 10-acre elevated park and open green spaces that cover an area equivalent to 23% of TRX, it will be the next central park and "grand-place" of Kuala Lumpur (Figure 2). TRX was launched in 2012 as a strategic economic enabler for Malaysia. It began operations in 2019, with the opening of Menara Prudential and Exchange 106. In 2022, HSBC Malaysia relocated its HQ to TRX, followed by the Affin Bank Group. Over the next few years, several other developments are expected to be completed, namely CORE Residence, TRX Residences and The Exchange TRX (Figure 3).



Figure 2: Illustration of The Exchange TRX, the lifestyle quarter with retail and 10-acre rooftop park



Figure 3: Illustration of physical progress of TRX Development

#### Positioning of TRX Development in Urban Sustainable Development

While Global Sustainability Goal, namely, United Nations SDGs, started in 2016, the TRX Master Plan Sustainability aspiration had come into play even during the inception stage in 2010. TRX City Sdn. Bhd. (TRXC), the Master Developer of TRX, had prioritised sustainability from the very beginning. The project is one of the early proponents of strong, district-wide sustainability standards.

TRXC has ensured that its partners, including Mulia Group, Lendlease, HSBC, Affin, Veolia and CORE Residence, are committed to the established site-wide sustainability standards for building design, building systems and materials as well as energy and resource usage. In this context, all Plot Developers (current and future) are required to achieve certain leadership in Energy and Environmental Design/ Green Building Index certification ratings (Figure 4).

TRX will then oversee the implementation of sustainability assessments of every plot within the whole district.

#### **Sustainbility Features**

The Sustainable Development Goal in the TRX Master Plan in 2010 was designed to achieve the following objectives:

- Reducing carbon emissions into the atmosphere.
- Recycling waste collection from sanitation systems and sewerage network in TRX district.

# **Print Service** pecial romotion

Business Card - 54mm x 90mm Gloss / Matt Art Card (Full Color)





- Annual Reports
- Booklets
- Brochures
- Buntings
- Business Cards
- CD / DVD Replications
- Calendars
- Cards & Invitations
- Certificates
- Custom Printings

# 260gsm

200pcs 300pcs RM 40 RM 50

310gsm

200pcs

300pcs

RM 50 RM 60

• Envelopes

- Folders
- NCR Bill Books
- Notepads
- Leaflets
- Letterheads
- Paper Bags
- Posters
- Stickers • Others



### **dimension**publishing

For other quantity and material, please contact:



Joseph How (+6) 011 1234 8181 Shirley Tham (+6) 016 283 3013

 Reducing usage of the potable water supplied by service provider by utilising the recycled water supply for non-potable water needs in all TRX buildings, such as for toilet flushing, cooling system etc.

These objectives were already in line with the UN SDGs although they were established prior to the UN SDGs which came later in 2015 and implemented in 2016.

**Goal: Reducing carbon emissions into the atmosphere (TRX district context):** By designing the district with pedestrian-friendly features, it encourages high take-up of public transport and promotes walkability within TRX and neighbouring commercial areas.

The TRX development is built to be climate resilient by integrating design features like awning structures to combat heatwaves and stormwater systems to minimise urban flood risks. In order to reduce urban heat island effect, open-grid pavement systems and high-SRI materials are applied.

Natural cooling methods and softscapes are incorporated into the public realm to create an oasis in the city. Nearly a quarter of the district is allocated for green spaces such as open plazas, pocket parks, streetscapes and the 10-acre

elevated park located at the heart of it. The TRX Public Realm will have 150 native species of flora and close to 150,000 plantings.

The Master Plan ensures seamless mobility in and around the district with easy access by rail (via MRT), road and pedestrian traffic. To encourage high public transport usage, the last-mile connectivity is made easy with shaded pedestrian walkways. Sheltered walkways lined with trees and shrubs generate cooler air, hence reducing average temperature and encouraging pedestrians to stroll through the public space. The extensive network of footpaths in TRX will connect the district to neighbouring commercial areas such as the Bukit Bintang shopping belt. It also lowers dependency on private vehicles which will reduce traffic and air pollution.

At the individual plot level, plot owners have also brought in their own sustainable practices, hitting the stipulated sustainability standards by using different measures and technologies that best suit their own buildings and public realm design. For instance, Exchange 106 and Menara Prudential have ameliorated the urban heat island effect with techniques such as open-grid pavement systems and the use of heat-reducing materials on non-roof hardscapes, including paving materials with solar reflection index.

Goal: Reducing carbon emissions into the atmosphere (plot owners' context): By designing the Building Envelope with less wasteful use of energy in the buildings, thus reducing energy consumption in buildings and simultaneously cutting down carbon emissions to the atmosphere.

Building envelope is the external portion of a building through which thermal energy is transferred and this



Figure 4: Building Level Sustainability Criteria and Certification Targets by Individual Plot

thermal transfer is the major factor that affects the interior comfort level and energy usage (MS 1525:2007, Clause 5: Building Envelope).

Fundamentally, the building envelope is designed to block out heat gain into buildings via conduction and radiation. In other words, the building envelope provides resistance to heat gain (MS1525: 2007 Clause 5.1).

In this context, TRX plot owners have made additional efforts to design the building envelope with the features that can reduce the heat transferred into the building and thus reduce the cooling load of the air-conditioning system. The related projects completed in TRX are:

- The Crown of Exchange 106 is double glazed with a vacuum with low U-value in the middle which prevents less heat being transferred into the building.
- The glass façades of Menara Prudential, Menara IQ and Menara Affin Bank buildings have additional UV coatings which reduces heat by 40%.

**Goal:** Recycling waste collection from sanitation systems and sewerage network: By having a strategic partnership with Veolia Water Technologies (Veolia) to build an On-site Wastewater Treatment and Recycling Plant.

One of TRX's greatest sustainability milestones is its on-site wastewater treatment and recycling plant which is the first fully integrated commercial water reclaim programme in South-East Asia. Operated by Veolia, the plant can recycle up to 13,300 litres of wastewater daily and targets to recycle at least 80% of used wastewater and to reduce potable water demand by 50%. The plant will be fully operational once the TRX development is completely occupied.

# Johnson Triton<sup>®</sup> Underdrains

Underdrains Systems that Save Your Time & Money



### Features:

- Utilizes world renowned Johnson"s Vee-Wire screen technology
- Vee-Wire surface designed to handle all types of media
- Delivered in fully assembled mode and require no grouting

### **Benefits:**

- Increased filter capacity
- Improved backwash effectiveness
- Longer filter runs
- Lower power consumption
- Ideal for retrofitting

### Comparison between Conventional System and Triton Underdrain System





Scan For More Info



Authorized Distributor Arachem (M) Sdn Bhd 198401014625 (127181-D)

www.arachem.com.my

marketing@arachem.com.my

+603-6276 2323

To reach the required targets, Veolia has combined 5 key technologies of advanced water solutions, including Multiflo Settler, AnoxKaldnes Moving Bed Biofilm Reactor (MBBR), Hydrotech Discfilters and Alizair Deodorisation treatment with a reduced chemical consumption and the lowest possible specific energy consumption (kWh/m<sup>3</sup> of production) to minimise carbon footprint.

The plant will supply safe, clean and odour-free recycled water for use in cooling, irrigation and toilets. The system also includes an in-house laboratory to allow analysis and to ensure continued compliance with the standard A of Department of Environment (DOE) Malaysia and the recycled water quality.

Goal: Reducing potable water usage supplied by service provider by utilising the recycled water supply for non-potable water needs in all buildings: 1) By developing a recycled water network within TRX to ensure the recycled water is fully used for the needs of non-potable water demand such as for toilet flushing, cooling system, etc. 2) By ensuring all buildings in TRX utilise water-efficient fittings and fixtures to further reduce demand.

With the target to reduce the usage of potable water supplied by service provider, TRXC has invested to develop a recycled water network to supply all the recycled water processed from the wastewater treatment plant.

The treatment plant will operate 24 hours a day, 7 days a week by a team of experienced Veolia employees and will offer huge benefits to the TRX Project in terms of environmental sustainability and water reuse.

The technologies utilised are not limited to the plant area. The treated water will be delivered via a smart water network which can detect and address leakage, targeting more than 98% network efficiency. The Endetec KAPTA installed within the network will also allow real-time monitoring of key parameters in the water distribution system and detect any change in water quality.

In addition, TRX applies a Smart Water feature that not only identifies leakage but also measures and gathers data of water flows from sources to consumption. The system covers monitoring of potable water supplies as well as of treated water and sewage water network which help reach the target reduction for potable water demand by 50%.

#### Current Development of TRX in Urban Sustainable Development

TRX is the first in South-East Asia to achieve both the USbased Leadership in Energy & Environmental Design (LEED) Neighbourhood Development at a Gold Pre-Certified Plan level as well as the Green Building Index (GBI) Township Award at Platinum provisional certification. The holistic district-wide design is complemented by similarly high standards at the individual plot level.

The very first building completed in TRX was Menara Prudential, a Grade A, LEED Gold and MSC-certified commercial building. It was conferred the Gold Winner in the Below 10 Years Non-strata Office category by The Edge Malaysia Best Managed & Sustainable Property Awards 2022.

# Intelligent engineering directly in the cloud

TwinCAT Cloud Engineering



Easy programming and parameterization of the entire environment directly in the cloud:

- supports highly efficient IoT-based automation concepts
- instantiation and use of pre-existing engineering products and TwinCAT Runtime directly in the cloud
- simplifies collaboration with integrated source control connection
- direct connection via the Beckhoff website
- easy, secure access to the control hardware
- different user profiles available



Learn more about engineering directly in the cloud

New Automation Technology BECKHOFF

At the same time, a leading green building nongovernmental organisation, Malaysia Green Building Council (MalaysiaGBC), in conjunction with MalaysiaGBC Leadership in Sustainability Awards Night 2022, conferred the Award of Winner and Honorary Mention to Menara IQ and Menara Affin Bank respectively, in the category of Best New Green & Sustainable Commercial Building.

#### From Sustainable Development to Smart City

In addition to achieving sustainable development goals in TRX district, TRXC is also working towards becoming a Smart City by harnessing the latest technology to ensure a secure, safe and efficient district.

In August 2022, TRXC announced the contract award to Willowglen (Malaysia) Sdn. Bhd. to deliver the TRX Integrated Management System (TiMS) which will enable the TRX District Management to have a single overview to manage, operate, control and monitor site-wide common facilities across the site. TiMS combines all equipment and systems in TRX into one platform and brings together traffic, tunnel control, building, public realm and security management as well as integration with facility, asset management and other external third party systems. The centralised platform will reduce the time needed to access information, enabling faster and more coordinated responses, particularly important during critical incidents or emergencies. Alarms, analytics and automated workflows enable cross-systems automation which further enhances response time and efficiency.

The TRX development is a significant project of national importance that responds to modern demands by incorporating sustainable design features centred on ESG (Economic, Social and Governance) principles. It is a futureproof and vibrant district that will improve KL's liveability, with the target of becoming one of the most sustainable developments globally.

#### Note:

All content and information in this article have received consent from TRX City Sdn. Bhd. and granted approval to be published in IEM JURUTERA Bulletin.

#### REFERENCES

- [1] Master Builder Journal, Vol 1/ 2022#124, Cover Feature on TRX
- [2] The Sustainable Backbone of TRX, April 6, 2021, Feature Story on TRX
- [3] United Nation Sustainable Development Goals, Goal 6: Ensure access to Water and Sanitation for all (https://www.un.org/ sustainabledevelopment/water-and-sanitation/)
- [4] United Nation Sustainable Development Goals, Goal 11: Make Cities Inclusive, Safe, Resilient and Sustainable (https://www.un.org/ sustainabledevelopment/cities/)
- [5] Lessons from a decade of emissions gap assessments, published by United Nation Environment Programme
- [6] MS 1525:2007, Clause 5: Building Envelope
- [7] Press Release, 2nd August 2022 TRX Awards Contract to Willoglen (Malaysia) Sdn Bhd for Its integrated Management System (https:// trx.my/press-release/tun-razak-exchange-awards-contractwillowglen-malaysia-sdn-bhd-its-integrated)



The AGENDA for the HYBRID Annual General Meeting is as follows:-

- 1.Welcome Address by the President for Session 2022/2023
- 2.Confirmation of Minutes of the 63rd Annual General Meeting held on 16 April 2022.
- 3. Matters Arising. 4. Annual Report / Financial Statements for Session 2022/2023.
- 5. Proposed Amendments to the IEM Constitution.
- 6. Discussion on written issues from members of which written notice is submitted to reach IEM Secretariat by 8 April 2023. (Please note that no matters under this item shall be discussed, unless prior written notice is received by 8 April 2023. This is in accordance to the IEM Constitution & Bylaws)
- 7. Presentation of Results of Election for Council Session 2023/2024.
- 8. Presidential Address 2023/2024.



## **FEATURES**





DESEA SDN BHD (566667-U) Level 19, Tower B, Plaza 33, No. 1, Jalan Kemajuan, Seksyen 13, 42600 Petaling Jaya, Selangor, Malaysia TEL: (603) 7883 6133 FAX: (603) 7883 6188 WEBSITE: www.himel.com

www.himel.com

# OSHCIM Guidelines: 5 Main Elements to Good Management Practices

#### Written and Prepared by:



#### lr. Dr Mohd Fairuz bin Ab Rahman

With the Construction Safety Division, Department of Occupational Safety & Health in Putrajaya.



Dr Mohamad Syamir Senin

With the Construction Safety Division, Department of Occupational Safety & Health in Putrajaya.



Ts. Mohd Fiqri Mohd Hanafi

With the Department of Occupational Safety & Health in Perlis.

hen the Guidelines on Occupational Safety & Health in Construction Industry (Management) or OSHCIM Guideline<sup>1</sup> was launched in 2017, the Department of Occupational Safety & Health (DOSH) made clear its main objective in the Message from its Director General: "To trigger improvements in the safety and health performance, the pre-requisite is for every stakeholder in the industry to work together towards a set of common objectives. To realise this, the Guidelines of Occupational Safety & Health in Construction Industry (Management) is developed to recommend the minimum roles of every stakeholder and how they can execute their responsibilities."

DOSH also made no secret that its primary target was to mandate voluntary recommendations on roles of construction project stakeholders in the guidelines into regulations.

The OSHCIM Guidelines recommends good management practices for the construction project team on how the construction site OSH management can be integrated into the overall process of project management. These practices require the whole construction project team – project owners (clients), designers, contractors and site workers – to work together towards a common end, which is to prevent OSH-related incidents and injuries. These good practices are condensed into the following 5 main elements:

1. Managing the risks by applying the principles of risk management and prevention.

- 2. Appointing the right people and organisations at the right time.
- 3. Making sure everyone has the information, instruction, training and supervision they need to carry out their jobs safely.
- 4. All employers in a project must cooperate and communicate with each other as well as coordinate their work.
- 5. Consulting workers and engaging with them to promote and develop effective measures to secure health, safety and welfare.

The OSHCIM Guidelines recommends that managing OSH in any construction project should be a shared responsibility among all employers in the supply chain, especially the client, designer and contractor. It is imperative that everyone involved in any construction project should take responsibility for and manage every risk he/she has created in any phase of a project, from conception, design, procurement, construction, start up and future maintenance to the use of the building, including demolition. This is to say OSH should be managed by those who created the risk throughout the whole life-cycle of any building or engineering structure (from cradle to grave).

As many engineers are employed in various capacities in any construction project team, it is essential that they understand the good management practices as recommended by the OSHCIM Guidelines. The proceeding paragraphs briefly explain the 5 main elements.

<sup>1</sup>Copy of the Guidelines is available here:

http://www.dosh.gov.my/index.php/en/legislation/guidelines/building-construction-engineering-work/2498-booklet-guidelines-of-occupational-safety-and-health-in-construction-industry/file

#### **Principles of Risk Management & Prevention**

These set out the principles that all employers should use in their approach to identify the practical measures they should take to control the risks in a particular project. A risk management process is a systematic way to make a workplace as safe as possible and it should also be used as part of the design process. It involves hazard identification, risk evaluation, risk control and a review of control measures. Part of the risk assessment is to determine who will be affected by the work activity. Persons at risk should also include workers who are not directly involved with the work activity but who possibly move around the site. Do take note that OSH risk management should be an active process, rather than be treated as merely superficial and a paper exercise to comply with the law.

The principles of prevention can be summarised as:

- Avoid risks where possible.
- Evaluate those risks that cannot be avoided.
- Put in place proportionate measures that control them at source.

The OSHCIM Guidelines recommends that designers and contractors take into account these principles when carrying out their duties. Applying these principles at the planning and design stages will enable the client, designer and contractor to actively manage the risk and integrate control measures in the design process to avoid or, if this is not practicable, minimise risks to safety and health throughout the life of the structure being designed.

Site safety can be affected by design safety. Design safety should be part of a wider set of design objectives, including practicability, aesthetics, cost and functionality. Sometimes, these competing objectives need to be balanced in a manner that does not compromise the safety and health of those who work on or use the product over its life-cycle. For example, closer attention should be given to the design and selection of tools, equipment and materials that, as far as practicable, to avoid or minimise the risks to safety and health.

## Appointing the Right Organisations/People at the Right Time

Appointing the right organisations and individuals to complete a particular project is fundamental to its success, including safety and health performance. In fact, the performance of any construction project is a function of every employer, organisation and individual that make up the construction team. Therefore, it is imperative that any employer who appoints another employer should ensure those appointed are competent and, vice versa, any employee should not accept the appointment unless he is competent. Similarly, any employer should not instruct his workers to carry out or manage, design or work unless they are deemed competent.

Any employer (such as the client) who is responsible for appointing designers or contractors to work on a project, should ensure that those appointed have the skills, knowledge and experience to carry out the work in a way that secures safety and health. If the one appointed is an organisation, it should also have the appropriate organisational capability. Those making the appointments should establish that those they appoint have these qualities before appointing them. Similarly, any designer/contractor seeking appointment as individuals should ensure he/she has the necessary skills, knowledge and experience.

The key person in a construction project should be appointed at the right time. For example, the client should appoint designers and contractors as



soon as practicable and before the start of the construction phase, so that they will have sufficient time to carry out their tasks to plan and manage the pre-construction and construction phases respectively.

#### **Supervision, Instructions and Information**

Providing supervision, instruction, information and training is required by the OSHA. In general, the employer must decide the level of supervision, instruction, training and supervision by the severity of the hazard, knowledge about controlling the hazard and the cost of controlling the hazard. The employer should also take into consideration the level of skills, knowledge, training and experience of his employees. How many times were worker actions/ capabilities regarded to have contributed to accidents? This indicates inadequate instruction, training and supervision which are, in fact, the statutory duties of the employer.

The employer must provide employees and workers under his control with the information and instructions they need to carry out their work without risk to safety and health. Information can be provided through safe working procedure and method statement, while instructions can be conveyed through toolbox talk, campaign and training. The OSHA also requires designers, such as engineers, who design plants for use at work, such as lifts, escalators, cranes, scaffolds and vehicles, to provide specific information to the manufacturer, user or any other person who use the design.

#### **Cooperating, Communicating & Coordinating**

The construction site is a unique workplace where more than one employer (including the client, designers and contractors) will usually carry out their respective activities in the same place. It is not uncommon that work activities of an employer will affect the safety and health of another employer as every employer is competing to complete their respective tasks. The OSHA requires every employer to ensure that these risks are managed effectively. Therefore, it is essential that all employers working on a site must cooperate with each other, especially in managing risk and coordinating their work to ensure safety and health.

Any employer who has control of the site (usually the main contractor) should ensure that other employers (such as the consultant and contractor appointed by the main contractor) who start work at different stages of the construction phase, cooperate with each other. This includes providing relevant information and instruction for a new contractor to carry out his work safely and communicating with each other to make sure everyone understands the risks and the measures to control those risks.

For example, regular dialogues or meetings should be conducted between the client, designer and contractor to ensure they have the time and resources to plan, manage, monitor and coordinate the pre-construction and construction phases. Likewise, the main contractor should also conduct progress meetings at suitable intervals to ensure his subcontractors are complying with the established construction phase plan. To facilitate better communication and coordination, it is important that a robust safe system of work is established.

#### **Consulting & Engaging with Workers**

Consulting and engaging with workers on decisions about safety and health measures can create safer and healthier workplaces. The process helps in generating ideas and building ownership and responsibility. Consultation on safety and health is a two-way communication. It involves giving information, instruction and training to the workers, listening to them and taking into account their opinions before the employer makes a decision. For example, there should be a meeting before work starts to discuss the work planned for the day, identify risks and discuss the agreed appropriate control measures. Involving workers help those responsible for safety and health to manage it in a practical way by:

- Helping spot workplace risks and knowing what to do about them.
- Making sure safety and health controls are appropriate.
- Increasing the level of commitment for working in a safe and healthy way.

During the pre-construction stage, those involved in the design stage should communicate with each other about potential risks and work together to find solutions so that a safe workplace can be achieved and sustained. Even in the early stages of a construction project, more informed decisions can be made on how the building or structure can be designed to eliminate or minimise risks by drawing on the knowledge and experiences of other people, including workers.

#### Conclusion

The OSHCIM Guidelines was developed based on key elements to ensure good OSH management of construction project. Implementing the recommendations of these guidelines will help the industry manage risks at the construction site.

# STILL THE GOLD STANDARD

# 3 SEC Dynamic Qr

QR Code changes every 3 seconds

MicroEngine

Integrated Security Systems



Dynamic QR

OnReader Dynamic QR Decryption

PLATO-Q82

## HIGH SECURITY DESFIRE DATA CARD READER

MIFARE DESFire provides the most secure, practically unbreakable 128 bit encryptions. PLATO-Q82 is capable of reading the secure data file in the DESFire Card to utilize the card security feature correctly.

### ANTI-CLONING USING DYNAMIC QR

New QR code is created every 3 seconds for the same ID using time sensitive formula and industry leading AES encryption technology.



## ONREADER DYNAMIC QR DECRYPTION

Decryption of the QR code is done in the reader. You do not need to have network connections or the cloud to operate this. Giving you maximum security availability.





**Retaining Wall Reinforcement** 

## MACCAFERRI GEOSYNTHETICS

The increasing of complexity and environmental challenges requires effective solutions with the use of geosynthetics in the civil engineering world today. **Maccaferri** 

**Geosynthetics** have been and continue to be used in all aspects of the transportation industry including, roadways, railroads, retaining walls, slopes and waterways. we offer specific product development and solutions to cater sophisticated challenges optimising value and simplifying your project.



**Asphalt Reinforcement** 

**Drainage for Structures** 



**Erosion** Control

Filtration

Separation



Maccaferri (Malaysia) Sdn. Bhd.

Unit 511, Block G, Phileo Damansara 1, No. 9, Jalan 16/11, Off Jalan Damansara, 46350 Petaling Jaya, Selangor Darul Ehsan, Malaysia. Tel: +60-3 7955 7800 Fax: +60-37955 7801 E-mail: info.my@maccaferri.com

Nurturing the World of Tomorrow









# Technical Site Visit to TRX Wastewater Treatment Plant Designed by Veolia Water Technologies

Written and Prepared by:





Ir. Lau Eng Kee

Ir. Mike Lau Yee Leong



Jason Chan Kar Leong

n conjunction with the 63rd IEM Annual Dinner & Awards Night 2022, the Urban Engineering Development Special Interest Group (UEDSIG) conducted a technical site visit to the Veolia Wastewater Treatment Plant in Tun Razak Exchange, Kuala Lumpur, on 23 July 2022. This is the first water treatment plant of its kind in the region and is the recipient of the IEM Outstanding Engineering Achievement Award 2021.

Twenty IEM members from UEDSIG, IEM Miri, Penang, Perak, Southern and Southern Young Engineers Section (YES) branches, took part in the visit led by Ir. Yau Chau Fong, Vice President of IEM and Chairman of Standing Committees (2022/2023).

The visit started with a tour of the international financial district, including Exchange 106, one of Asia's tallest towers, the central business district area and TRX's world-class public realm, after which the group attended a briefing on the overview of the 70-acre project and its master plan by TRX representatives Ar. Ahmad Ridzuan and Ir. Chua Long Siew.



Figure 1: Sludge silo for biological treatment

Veolia Water Technologies (VWT) Plant Manager, Muhammad Farid bin Mazlan, assisted by VWT Performance and Sustainability Manager Mohammad Aizuddin bin Mohammad Ismail, gave a short briefing on the country's first private Wastewater & Recycling Plant.

The group was then taken on a technical visit of the facilities. The enclosed plant is required to be built as part of the commercial structure within the limited space of the busy commercial hub. The first fully Integrated Wastewater Treatment Plant in South-East Asia is a key component of TRX's sustainability framework and aims to be a global reference for sustainable development.

The plant, which can treat up to 13,300 litres of wastewater daily, will help cut half of TRX's potable water demand.

- a. Primary Settler: Multiflo Settler.
- b. Biological Treatment: AnoxKaldnes<sup>™</sup> Moving Bed Biofilm Reactor (MBBR) to remove BOD/ COD and nitrogen.
- c. Secondary Settler: Hydrotech Discfilters to separate liquids and solids.
- d. Tertiary Treatment: Dual Media Filter (DMF), UV Disinfection system and Chlorination for fine polishing of treated effluent, bacteria reduction and disinfection.
  - e. Deodorisation Treatment: Alizair<sup>™</sup> (Biological Odour Treatment) and Granular Activated Carbon (GAC) to reduce foul smell, pollutants and impurities.

These technologies allow reduced chemical consumption and the lowest specific energy consumption (kWh/m<sup>3</sup> of production) to minimise carbon footprint.

The technologies utilised are not limited to within the plant area. The treated water is also delivered in a smart water network that can detect and address leakage, targeting more than 98% network efficiency. The Endetec KAPTA installed within the network will also allow real-time monitoring of key parameters in the water distribution system and detect any changes in water quality. The treatment plant will operate 24/7, manned by a team of experienced employees and will offer numerous benefits to the TRX Project in terms of environmental sustainability and water reuse.

TRX City Sdn. Bhd., the master developer of TRX, is 100% owned by Minister of Finance Incorporated and its role transcends beyond that of ordinary property development. With an estimated GDV of more than RM40 billion, it will encompass investment grade A office space underpinned by world-class residential, hospitality, retail, leisure and cultural offerings.

Figure 2: Hydrotech Discfilter

As a world leader in water reuse, Veolia aims to recover at least 80% of sewage or wastewater generated annually from the whole TRX development area. Providing safe, clean and odour-free recycled water for use in district cooling, irrigation and in toilets, the plant is also equipped with an in-house laboratory to allow for internal analysis to be conducted and ensure continuous compliance towards the legal and client requirements.



Figure 3: Pumpsets after the Dual Media Filter (DMF)



Figure 4: Group photo of IEM members with TRX representatives

As a district with the best connectivity in KL, TRX features an integrated MRT interchange station for the Kajang and Putrajaya lines. This is further supported by direct links to major thoroughfares such as Jalan Tun Razak, the MEX highway, SMART Tunnel and upcoming DUKE 3 (Setiawangsa-Pantai Expressway).

To date, TRX has signed on global property and infrastructure group Lendlease to jointly develop the Exchange TRX, Indonesia's leading property developer, Mulia International, to develop The Exchange 106, HSBC Malaysia and Affin Bank Berhad for their new HQs, IJM Bhd. to build and to lease Prudential Malaysia's new HQ and CORE Precious Development Sdn. Bhd. for residential plot.

![](_page_38_Picture_4.jpeg)

Figure 5: Briefing session on The TRX development

![](_page_38_Picture_6.jpeg)

Figure 6: Ir. Yau Chau Fong presenting tokens of appreciation to the TRX representative

![](_page_38_Picture_8.jpeg)

Figure 7: Group photo of IEM members and Veolia Plant representatives

.....

### **Upcoming Activities**

Webinar Talk Topic: Additive Manufacturing: Advancing The **Future of Manufacturing** 

5 April 2023 (Wednesday)
2.00 p.m 4.00 p.m.
Digital Platform
2
Mr. Lim Mun Chun

#### 2 Days Professional Development Workshop

Date	:	10 - 11 April 2023 (Monday - Tuesday)
Time	:	9.00 a.m 5.00 p.m.
Venue	:	IEM Penang Branch, Gelugor, Pulau Pinang
Approved CPD	:	15
Speakers	:	Ir. Looi Hip Peu
	:	Ir. Yau Chau Fong
	:	Ir. Lee Cheng Pay

#### Technical Talk on Bursa Carbon Exchange: Accelerating a Net Zero Future

Date	:	8 April 2023 (Saturday)
Time	:	9.00 a.m 11.00 a.m.
Venue	:	Wisma IEM
Approved CPD	:	2
Speaker	:	Dr Wei-nee Chen

#### 64th Annual General Meeting of The Institution of Engineers, Malaysia (PHYSICAL)

Date	:	15 April 2023 (Saturday)
Time	:	9.00 a.m 11.00 a.m.
Venue	:	Wisma IEM
Approved CPD	:	4

## **Subscribe to IEM's Publications Now!**

Yes! I would like to be a subscriber of The Institution of Engineers, Malaysia's publications

Name:		
Mailing Address:		
	Country:	
Company/Institution:		
Title:		
Telephone No: Fax:	Email:	
New Subscriber Renewal		
Please commence my subscription from:	(month/year) Signature:	
To start your subscription of IEM's publications, complete this form a +603 7493 1047. Thank you.	nd mail it back to the address below. For faster processing, fax it to:	
What is your primary job title?	What are the main activities of your organisation? (Tick all that apply)	
Corporate Management (including chairman, president, proprietor,	Constructions of: Manufacturer of:	
partner, director, vice president, general manager, division manager, import/evnort manager, other corrorate title)	Roads/bridges Construction equipment	
Management (including project/contract/equipment/service/transport	Dams/reservoirs/irrigation Cement	
district manager, clerk of works, other technical or operating manager)	Harbours/offshore structures Other construction materials	
Engineering/Design (including chief engineer, chief designer, civil/	Foundations/tunnels Distribution	
Ruving/Purchasing (including chief huver huver huver purchasing officer	Structures/steel work	
other buying/purchasing title)	Building (commercial, industrial) Hire/rental of construction equipment	
Titles allied to the field (architect, consultant, surveyor, research and	Housing	
development professor, lecturer, supervisor, superintendent, inspector or other allied title)	Construction management Earth-moving/open cast mining	
Others (please specify)	Deep mining Aggregate production	
_	Others (Please specify)	
What type of organisation do you work in? (Tick one box only)	Poto (Diagon tiak)	
Contractor		
Sub-contractor specialist	RM360.00 - 12 issues of JURUTERA	
Design and build contractor	Rimo4.00 - 2 issues iEm Journal (Hall-yearly)	
Consulting engineering/architectural/quantity surveying practice	Terms and Conditions:	
Mining/quarrying/aggregate production company	1) The subscription is to be prepaid.	
Petroleum producer	<ol> <li>2) Flease make cheque payable to Dimension Publishing Sun. Bitu.</li> <li>3) Subscriptions are not refundable.</li> <li>4) Magazine/s will be sent to the mailing address given.</li> <li>5) Students are entitled for a 20% discount from the above subscription rate.</li> </ol>	
International/national authorities		
National/regional/local government	<ul><li>6) Students must submit a photocopy of the student identification card together</li></ul>	
Public utilities (electricity, gas, water, deck and harbour, other)	<ul><li>7) The above rate is inclusive of delivery charges and applicable in</li></ul>	
Manufacturer	Malaysia only. 8) Additional delivery charges will apply to overseas subscribers	
Distributor/importer/agent		
Construction department of large industrial/Commercial concern	For subscription enquiries, please contact +603-7493 1049 or email to info@dimensionpublishing.com.	
Association/education establishment/research		
Construction equipment hire/rental company		
Project/construction management consultancy		
Uniers (please specify)		

![](_page_39_Picture_3.jpeg)

 
 dimensionpublishing
 DIMENSION PUBLISHING SDN. BHD. (449732-T)

 The Choice of Professionals
 Level 18-01-02, PJX-HM Shah Tower, No. 16A, Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
 Tel +603 7493 1049 Fax +603 7493 1047 Website www.dimensionpublishing.com

APRIL 2023 39

# Urban Flash Flood Prediction with New Curve Number Methodology

Written and Prepared by:

![](_page_40_Picture_4.jpeg)

Ir. Dr Ling Lloyd

rban flash flood is a growing concern in cities around the world. It occurs when heavy rainfall overwhelms the capacity of a city's stormwater management systems, leading to the accumulation of water on streets and low-rise areas. This can cause significant damage to buildings and infrastructure as well as pose serious risks to public health and safety. There are several ways that cities can address the problem of urban flooding.

One approach is to improve the capacity of stormwater management systems by constructing new detention basins or increasing the size of existing ones. Another is to use "green infrastructure" such as green roofs, permeable pavements and rain gardens to absorb and filter water while reducing the amount of runoff entering stormwater systems.

Climate change is having a significant impact on flood modelling and the prediction of flood risks. As the climate changes, the pattern and intensity of precipitation are likely to change, which can affect the likelihood and severity of flooding. For example, some areas may experience more frequent heavy rain events, while others may experience longer dry periods followed by intense rainfall. These changes can make it more difficult to accurately predict flood risks using traditional flood models. In addition, climate change is likely to affect the physical characteristics of the landscape, such as soil conditions and vegetation, which can also impact flood risk. For example, rising temperatures and changes in precipitation patterns may lead to the loss of vegetation cover, which can increase the amount of runoff and the risk of flooding.

![](_page_40_Picture_9.jpeg)

Artist's impression of City Flooding Source: Google Image

Overall, urban flooding is a complex problem that requires a multi-faceted approach to address. By using a combination of technical solutions and individual action, cities can work to reduce the risk of flooding and protect residents and infrastructure from the damaging effects of heavy rainfall.

![](_page_40_Picture_12.jpeg)

Flood-Damaged Vehicles Source: Google Image

To address the challenges posed by climate change, flood models may need to be modified or updated to incorporate the latest data on changing climate conditions and the potential impacts on flood risk. This may require the use of more complex models that can better capture the dynamic and uncertain nature of the system being modelled<sup>1,2</sup>. The Soil Conservation Service (SCS) Curve Number (CN) method is a widely used technique for estimating runoff from precipitation in a drainage area. It is used to predict the amount of runoff that will occur from a specific area after a rainfall event, which can be helpful in predicting flood potential in urban areas. The SCS CN runoff predictive methodology uses a simple formula to estimate runoff based on the type of land cover, the amount of precipitation and the initial abstraction (the amount of precipitation that is lost to infiltration and evaporation before it becomes runoff). The SCS CN method has been widely used for decades but it has some limitations, particularly in urban areas where the land cover is complex with mixed development and there are many impervious areas<sup>1-4</sup>.

![](_page_41_Picture_3.jpeg)

The newly developed period free return CN runoff predictive methodology does not rely on long historical rainfall-runoff data, but rather uses the most recent rainfallrunoff dataset at the watershed of interest to model the latest runoff characteristics of the watershed and estimate the runoff amount. It is also capable of estimating runoff amount the according to the ground saturation conditions of

https://doi.org/10.3390/ books978-3-0365-0821-4 Source: MDPI

the watershed. This new runoff predictive methodology is also able to derive statistically significant curve numbers for a watershed of interest<sup>2-4</sup>.

Using the most recent rainfall-runoff data for the watershed of interest can be beneficial in providing a more accurate estimate of runoff, as the hydrological conditions of a watershed can change over time due to factors such as land use changes, urbanisation and climate change. By using the most up-to-date data, the return period free CN method can provide a more accurate prediction of runoff and flood risk. The ability to derive a statistically significant CN value with confidence interval range for a specific watershed is also a useful feature, as it allows the return period free CN method to be tailored to the specific hydrological characteristics of the watershed. This can help to improve the accuracy of the runoff prediction and

provide a more reliable estimate of flood risk. In addition to these benefits, the return period free CN method also has the advantage of not relying on long historical rainfall-runoff data, which can be difficult to obtain in some cases. This makes it a useful tool for predicting runoff and flood risk in areas where such data is not available or is limited. This methodology has also been tested and implemented at several locations in Malaysia<sup>1, 2, 4</sup>.

#### **Funding:**

The research was supported by the Ministry of Higher Education (MoHE) through the Fundamental Research Grant Scheme (FRGS/1/2021/WAB07/UTAR/02/1).

#### REFERENCES

- Ling, L.; Yusop, Z.; Ling, J.L. Statistical and Type II Error Assessment of a Runoff Predictive Model in Peninsula Malaysia. Mathematics 2021, 9, 812. https://doi.org/10.3390/math9080812
- [2] Ling, L.; Lai, S.H.; Yusop, Z.; Chin, R.J.; Ling, J.L. Formulation of Parsimonious Urban Flash Flood Predictive Model with Inferential Statistics. Mathematics 2022, 10, 175. https://doi.org/10.3390/ math10020175
- [3] Ling, L.; Yusop, Z.; Yap, W.-S.; Tan, W.L.; Chow, M.F.; Ling, J.L. A Calibrated, Watershed-Specific SCS-CN Method: Application to Wangjiaqiao Watershed in the Three Gorges Area, China. Water 2020, 12, 60. https://doi.org/10.3390/w12010060
- [4] Ling, L.; Yusop, Z.; Chow, M.F. Urban flood depth estimate with a new calibrated curve number runoff prediction model. IEEE Access 2020, 8, 10915–10923. https://ieeexplore.ieee.org/document/8952667

#### **Upcoming Activities**

.....

#### **Technical Talk on Design of Caverns In Rock**

Date	:	17 April 2023 (Monday)
Time	:	4.30 p.m 6.30 p.m.
Venue	:	Wisma IEM
Approved CPD	:	2
Speakers	:	Mr. Jason Chin
	:	Mr. Jack Muir

#### Physical Talk Evolution of Commercial Aircraft Technology and Aircraft Maintenance Engineers' Training

Date	:	29 April 2023 (Wednesday)
Time	:	9.00 a.m 11.00 a.m.
Venue	:	Wisma IEM
Approved CPD	:	2
Speaker	:	Ir. Ricky Liew Chee Leong

# **Trekking the Tracks**

#### Written and Prepared by:

![](_page_42_Picture_4.jpeg)

An IEM Graduate member, pursuing postgraduate studies at Universiti Tenaga Nasional (UNITEN).

s I get to travel to different project sites and conferences all over the country in the course of my job, I try to fully utilise any opportunity to Cuti-Cuti Malaysia. Trained as a mechanical engineer, my passion for trains has driven me to embark on a journey to experience the different railway lines. In fact, the goal to travel on every single railway line in Malaysia is on my bucket list!

Train tourism, or fondly known as cuti kereta api, is something that brings me on scenic routes without the stress of driving and provides a break from the hectic life of an engineer while wondering how our engineering forefathers have helped shaped this efficient mode of mass transportation.

From the railways in the peninsula (serviced by Keretapi Tanah Melayu Berhad or KTMB) to the Sabah State Railway which links Tanjung Aru in Kota Kinabalu to Tenom, each track offers different sceneries and has different rolling stocks that services them.

One may experience a sleeper train, also known as overnight service train, or intercity trains that traverse the iconic East Coast line. Fancy Shinkansen style travel without leaving Malaysia? Take a ride on the Electric Train Service (ETS) of the West Coast line!

If you want that nostalgic experience of yesteryear in Sabah, you'd enjoy the Sabah State Railway's Sunday service from Beaufort to Halogilat just for the view and the opportunity to mingle with the locals!

So go hop on a train to relive those memories of train travel. It's very affordable and you get to explore the beauty of Malaysia and the fascinating engineering behind those tracks!

![](_page_42_Picture_12.jpeg)

Figure 1: Scenic view along Beaufort-Halogilat route on Sabah State Railway

![](_page_42_Picture_14.jpeg)

Figure 2: KTMB Diesel Multiple Unit (DMU) at Gua Musang Station, Kelantan

![](_page_42_Picture_16.jpeg)

Figure 3: Sabah State Railway's Hitachi locomotive built in 1968

![](_page_42_Picture_18.jpeg)

Figure 4: KTMB ETS which serves KL Sentral-Ipoh line approaching Kuala Lumpur Station

BE HONS (UNITEN) (MECHANICAL, 2019)

111853 SHATISWARREN A/L PACHIAPPAN

Tarikh: 8 Mac 2023

Kepada Semua Ahli,

#### SENARAI CALON-CALON YANG LAYAK MENDUDUKI TEMUDUGA PROFESIONAL TAHUN 2023

Berikut adalah senarai calon yang layak untuk menduduki Temuduga Profesional bagi tahun 2023.

Mengikut Undang-Undang Kecil IEM, Seksyen 3.8, nama-nama seperti tersenarai berikut diterbitkan sebagai calon-calon yang layak untuk menjadi Ahli Institusi, dengan syarat bahawa mereka lulus Temuduga Profesional tahun 2023.

Sekiranya terdapat Ahli Korporat yang mempunyai bantahan terhadap mana-mana calon yang didapati tidak sesuai untuk menduduki Temuduga Profesional, surat bantahan boleh dikemukakan kepada Setiausaha Kehormat, IEM. Surat bantahan hendaklah dikemukakan sebulan dari tarikh penerbitan dikeluarkan.

#### Ir. Prof. Dr Zuhaina binti Zakaria

Setiausaha Kehormat, IEM

PERMOHONAN BARU					
Nama	Kelayakan				
KEJURUTERAAN AWAM					
MOHD RIDZUAN BIN SALIMAN	BE HONS (UTM) (CIVIL, 2008)				
NORSYAMZARINA SAMSUDEN	BE HONS (UKM) (CIVIL & ENVIRONMENTAL, 2000)				
KEJURUTERAAN ELEKTRIKAL					
ABDUL MARMADRULNISHAM BIN OMAR	BE HONS (UITM) (ELECTRICAL, 2017)				
FOON CHUN YIN	BE HONS (UNITEN) (ELECTRICAL POWER, 2019)				
MOHD SAFIUDDIN BIN MANSOR	BE HONS (UITM) (ELECTRICAL, 2007)				
MUHAMMAD FIRDAUS BIN ROSLI	BE HONS (UNITEN) (ELECTRICAL POWER, 2013)				
MUHAMMAD HILMI BIN ZAINUDDIN	BE HONS (UTM) (ELECTRICAL, 2015)				
NORFADHILAH BINTI TUKICHAN	BE HONS (UTM) (ELECTRICAL, 2014)				
	-				
KEJURUTERAAN MEKANIKAL					
HAFIZA NUR BINTI MARUNI	BE HONS (UTeM) (MECHANICAL (STRUCTURE & MATERIAL), 2011)				
HASZNIL AFIS BIN ALIAS	BE HONS (UKM) (MECHANICAL, 2007)				
MARINI BINTI SAWAWI	BE HONS (UNIMAS) (MECHANICAL & MANUFACTUIRING SYSTEMS, 1999) ME (UTM) (MECHANICAL, 2005) PhD (MONASH) (2016)				
MUHAMAD ROSLAN BIN DARUL AMAN	BE HONS (UTeM) (MECHANICAL (STRUCTURE & MATERIAL), 2011)				
PERMOHONAN MENJADI AHLI KORPORAT					
Nama	Kelayakan				
KEJURUTERAAN AWAM					
LIM ZHE XIAN	BE HONS (RMIT) (ELECTRICAL & ELECTRONIC, 2017)				

No. Ahli	Nama	Kelayakan
KEJUI	RUTERAAN AWAM	
119806	ANTON IWAN DANDOT	BE HONS (RMIT) (CIVIL & INFRASTRUCTURE, 2014) ME (RMIT) (STRUCTURES & FORENSICS, 2014)
97346	KHOO YIT SHEUN	ME HONS (NOTTINGHAM) (CIVIL, 2017)
90740	KUEK CHAI JIAN	BE HONS (CIVIL & STRUCTURAL, 2018)
65776	MOHAMMAD RIDHWAN BIN ZULKAFLI	BE HONS (UITM) (CIVIL, 2014)
27392	NOOR SHEENA HERAYANI BINTI HARITH	BE HONS (USM) (CIVIL, 2008) MSc (USM) (CIVIL, 2011) PhD (UTM) (CIVIL, 2016)
38791	SHAHRIZAL BIN SAMAT	BE HONS (UKM) (CIVIL & STRUCTURAL, 1999)
81300	WAN CHEE WAI	BE HONS (UKM) (CIVIL & STRUCTURAL, 2008)
102388	WONG PIK YEN	BE HONS (UTHM) (CIVIL, 2010)
72630	WOON WAI JACK	BE HONS (UTM) (CIVIL, 2013)
KEJUI	RUTERAAN GEOTEKNIKAL	
81308	THONG CHIA CHIA	BE HONS (UNIMAS) (CIVIL, 2012) ME (UNIMAS) (2016)
KEJUI	RUTERAAN MEKANIKAL	
121059	CHIN BEI YI	BE HONS (CURTIN) (MECHANICAL, 2019)
105537	RAMKEE A/L MARAN	BE HONS (UNITEN) (MECHANICAL, 2015)

 105537
 RAMKEE A/L MARAN
 BE HONS (UN

 51897
 ROLF WILLAANAK PATRICK SANDIN
 BE HONS (UN

BE HONS (CURTIN) (MECHANICAL, 2019) BE HONS (UNITEN) (MECHANICAL, 2015) BE HONS (UNIMAS) (MECHANICAL & MANUFACTURING, 2015)

	PERPINDAHAN MEN	JADI AHLI KORPORAT
No. Ahli	Nama	Kelayakan
KEJUF	RUTERAAN AWAM	
71693	CHOO CHUNG SIUNG	BE HONS (SWINBURNE) (CIVIL, 2010) PhD (SWINBURNE) (2015)
29214	SITI SALWA BINTI OTHMAN	BE HONS (UKM) (CIVIL & ENVIRONMENTAL, 2005) ME (UTM) (STRUCTURE, 2018)
KEJUF	RUTERAAN KIMIA	
44579	HII CHING LIK	BE HONS (UMIST) (CHEMICAL, 1996) MSc (UPM) (FOOD PROCESSING AND ENGINEERING, 2004) PhD (NOTTINGHAM) (2010)
KEJUF	RUTERAAN MEKANIKAL	
28855	UCOK RAHENRA BIN HASMAR	BE HONS (MALAYA) (MECHANICAL, 2006)
KEJUF	RUTERAAN SUMBER MINERAL	
18300	SYED FUAD BIN SAIYID HASHIM	BE HONS (USM) (MINERAL RESOURCES, 1996) MSc (USM) (MINERAL RESOURCES, 1999) PhD (QUEENSLAND) (MINING, MINERALS & MATERIALS, 2004)
PE	RPINDAHAN MENJADI AHLI	TEKNOLOGIS KEJURUTERAAN
No. Ahli	Nama	Kelayakan
KEJUF	RUTERAAN AWAM	
28090	LEONG WEI BOON	BE HONS (USM) (CIVIL, 2007)
KEJUF	RUTERAAN ELEKTRONIK	
49632	RAJESHPARAN A/L RANGARAJ	B.TECH (HONS) (USM) (QUALITY CONTROL AND INSTRUMMETATION, 2001) MSC (UKM) (INDUSTRIAL AND TECHNOLOGY MANAGEMENT, 2011)
PE	RPINDAHAN MENJADI AHL	I JURUTEKNIK KEJURUTERAAN
No. Ahli	Nama	Kelayakan
KEJUF	RUTERAAN ELEKTRONIK	
117153	ABDUL MALEK BIN MOHD SALLEH	DIPL. (POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH) (ELECTRONIC - MEDICAL, 2010)
KEJUF	RUTERAAN MEKANIKAL	

Pengumuman yang <u>ke-173</u>

#### SENARAI PENDERMA KEPADA WISMA DANA BANGUNAN IEM

Institusi mengucapkan terima kasih kepada semua yang telah memberikan sumbangan kepada tabung Bangunan Wisma IEM. Ahli-ahli IEM dan pembaca yang ingin memberikan sumbangan boleh berbuat demikian dengan memuat turun borang di laman web IEM http://www.iem.org.my atau menghubungi secretariat di +603-7968 4001 / 5518 untuk maklumat lanjut. Senarai penyumbang untuk bulan Februari 2023 adalah seperti jadual di bawah:

NO.	NO. AHLI	NAMA
1	115258	MR. AZRIE BIN OSMAN
2	23757	MR. NOOR AZAM BIN SAMSUDIN
3	22886	Ir. CHEONG POH WAH
4	30592	MR. MASWADY BIN MASKIN
5	21275	MR. YONG KOK HOONG
6	86590	MR. LEE CHEE KIEN
7	75331	MR. ANG CHIN KEAT
8	12458	DATO' Ir. NOR HISHAM BIN MOHD. GHAZALI
9	02659	Ir. WEE KIM SIANG
10	87693	MR. V SARAVANA KUMAR A/L VEERIAH
11	07039	Ir. WONG YII HENG
12	116197	MR. ALEX ABEL
13	13254	MR. LIM JOO PERNG
14	17679	Ir. CHOY WENG WAH
15	25252	MR. FOO YEW CHIN
16	12239	Ir. SOH CHOR CHIEW

#### **PERMOHONAN BARU / PEMINDAHAN AHLI**

Persidangan Majlis IEM yang ke-429 pada 17 Januari 2022 telah meluluskan sebanyak 682 ahli untuk permohonan baru dan permindahan ahli. Berikut adalah senarai ahli mengikut disiplin kejuruteraan:

						GRED KEAHLIAN						
DISIPLIN	FELO	SENIOR	AHLI	SENIOR GRADUATE	SISWAZAH	"INCORPORATED"	"AFFILIATE"	"ENGINEERING TECHNOLOGIST GRADUATE MEMBER"	"ENGINEERING TECHNICIAN GRADUATE MEMBER"	"ASSOCIATE"	SISWA	JUMLAH
Aeronautikal					4							4
Aeroangkasa			2					2			1	5
Pertanian											1	1
Automotif								1			2	3
Bioperubatan											3	3
Kimia	1		1	1	16						20	39
Awam			9	11	85	2			1	2	101	211
Komunikasi											2	2
Komputer											1	1
Komputer & Komunikasi											1	1
Pembinaan											1	1
Elektrikal & Elektronik											38	38
Elektrikal		5	15	6	55			1		1	21	104
Elektronik				6	18	1		2	2		17	46
Alam Sekitar					1	1		1				3
Lebuhraya			1									1
Pembuatan			1		5						7	13
Marin					1			1				2
Bahan					1							1
Mekanikal	1		11	9	59			5	1		97	183
Mekatronik				1	6			1			4	12
Perlombongan				1	1							2
Petroleum					3						1	4
Telekomunikasi					1							1
Arkitek							1					1
JUMLAH	2	5	40	35	256	4	1	14	4	3	318	682

Senarai nama ahli dan kelayakan adalah seperti di bawah. Institusi mengucapkan tahniah kepada ahli yang telah berjaya.

Ir. Assoc. Prof. Dr David Chuah Joon Huang

Setiausaha Kehormat, Institusi Jurutera Malaysia, Sesi 2021/2022

PE	RMINDAHAN AHLI KEP	ADA AHLI FELLOW	93543	LIEW KHANG YUEH	BE HONS (UTAR) (CIVIL, 2016)	73286	NG TZE HERNG	BE HONS (RMIT) (ELECTRICAL, 2013)
No. Ahli	Nama	Kelayakan	59133	MUHAMMAD HAZRIN BIN YACOB	BE HONS (UiTM) (CIVIL, 2009) MSc (UiTM) (CIVIL-	59906	SYAHRUL NIZAM BIN MD SAAD	BE HONS (UNITEN) (ELECTRICAL & ELECTRICAL \$ 2005)
KEJU 56803	RUTERAAN AWAM MOHD AZMI BIN ISMAIL	BE HONS (MIDDLESEX) (CIVIL, 1986) MSc (UITM) (INTEGRATED CONSTRUCTION AND PROJECT	102383 54243	MUHD AL HAFIZ BIN MUHAMMAD YUSOFF RAZWAN BIN ABDUL RASHID AHMAD	BE HONS (UNIMENTAL, 2013) BE HONS (UNIMAP) (BUILDING, 2013) BE HONS (UTP) (CIVIL, 2011) MSc (UTM) (PETROLEUM.	KEJU	RUTERAAN LEBUHRA	ME (UNITEN) (ELECTRICAL, 2012) PhD (EDINBURGH) (2020)
		MANAGEMEN 1,2000)			2014)	43536	ABDUL JAMEEL BIN A. ABDUL GAFOOR	BE HONS (UNISEL) (CIVIL, 2009)
17629	AZIZUL AZUAN BIN SAHRUM @ MD. DAUD	BSc HONS (WESTERN MICHIGAN) (MECHANICAL, 1992)	KEJU 114796 72725	RUTERAAN ELEKTRIK ABU HASSAN BIN MOHAMMED NAZARI CHUA HOCK GUAN	AL BE HONS (QUEENSLAND) (ELECTRICAL, 2016) BE HONS (UTHM)			MBA (EAST LONDON) (INTERNATIONAL BUSINESS, 2014)
	PEMINDAHAN KEPADA	AHLI 'SENIOR'			(ELECTRICAL, 2010) ME (UTHM) (ELECTRICAL,	62059	RUTERAAN MEKANIK CHAIN MENG YEE	AL BE HONS (MONASH)
No. Ahli	Nama	Kelayakan	66360	CHUA KEIN HUAT	2013) BE HONS (UKM) (ELECTRICAL	74201	KOH WEI HAO	(MECHANICAL, 2012) ME HONS (BATH) (MECHANICAL, 2014)
KEJU 87517	RUTERAAN ELEKTRIK AHMAD FAUZI BIN OTHMAN	AL BE HONS (UTM) (ELECTRICAL, 2005)			ELECTRONIC AND SYSTEMS, 2004) ME (MALAYA) (2009) PhD (UTAR) (2017)	27492	LIOW SOON SHAK	(MEOLINATION L, 2011) BE HONS (UNIMAS) (MECHANICAL & MANUFACTURING SYSTEMS 2006)
24165	CHIN SUN SEK	BE HONS (UTM) (ELECTRICAL, 2002)	54006	HAU MIN TZE	BE HONS (MMU) (ELECTRICAL, 2010)	80742	LOH KWAN JOU	BE HONS (UTAR)
62021	MICHELLE LU	BE HONS (CURTIN) (ELECTRICAL, 2006) ME (UNIMAS) (2013)	112711	LEE YAN KANG	BE (CARLETON) (ELECTRICAL, 2015)	87110	MUHAMMAD AIZUDDIN BIN MUFID	(MECHANICAL, 2012) BE HONS (UPNM) (MECHANICAL, 2015)
24146	MOHAMAD IKHRANIZAM BIN MOHAMAD ROS	PhD (UNIMAS) (2017) BE HONS (UNITEN) (ELECTRICAL 2000)	29817	LING HENG YEW, TONNY	BE HONS (LIVERPOOL) (ELECTRICAL & ELECTRONICS, 1999)	49610	TEO EU JIN	BE HONS (USM) (MECHANICAL, 2010)
58057	WAN YUSRIZAL BIN WAN YUSOFF	BE HONS (UTM) (ELECTRICAL, 2006)	97487	MUHAMAD AFIQRI BIN IBRAHIM	BE HONS (UNITEN ) (ELECTRICAL POWER, 2013)	<b>KEJU</b> 66719	RUTERAAN PEMBUAT JOSHUAA/L JAYA	AN BE HONS (USM)
PE	MINDAHAN AHLI KEPAI	DA AHLI KORPORAT	36871	MUHAMMAD MUZAWAHIR BIN LIJONG	BE HONS (UITM) (ELECTRICAL, 2004)		PRAKASH	(MANUFACTURING ENGINEERING WITH MANAGEMENT, 2010)
No. Ahli	Nama	Kelayakan	21203	MUZAMIR BIN ISA	BE HONS (UTM) (ELECTRICAL, 2001) ME (UTHM)			MARKOEMENT, 2010)
KEJU 36989	RUTERAAN AWAM AWANG ZAIDELADHA BIN	BE HONS (USM) (CIVIL,			(ELECTRICAL, 2004) PhD (AALTO UNIVERSITY) (2013)			

4947

KF

1163

KE

1161

1161

1166

1163

116194 TAN CHEE LEONG

**KEJURUTERAAN PERLOMBONGAN** 116474 MOHD RUZMI KHAIRI BIN RUSLI

BE HONS (USM) (MINERAL RESOURCES, 2007)

	PERIKSAAN PENILAIA	N PROFESIONAL)
No. Abli	Nama	Kelayakan
KE.III		KASA
24204	CHUA YAW LONG	BE HONS (UPM) (AEROSPACE, 2000) MSc (SHEFFIELD) (CONTROL SYSTEMS,
80786	TANG KOK CHEONG	2004) BE HONS (SALFORD) (AERONAUTICAL, 1994) PhD (SALFORD) (1998)
KEJU	RUTERAAN AWAM	
08123	MANSOR BIN IBRAHIM	ADV.DIP (UiTM) (CIVIL, 1984)
KEJU	RUTERAAN MEKANIKA	\L
71184	CHONG KOK HING	BE HONS (UNIMAS) (MECHANICAL & MANUFACTURING, 2006) ME (UNIMAS) (MECHANICAL, 2009) PhD (UNIMAS) (2015) BE HONS (LEEDS)
	YUSOF	(MECHANICAL, 1995)
21798	SHAMSUL AMRI BIN SULAIMAN	BSc (VIRGINIA STATE UNI) (MECHANICAL 1998)
94120	JEFFREY	(MEDIANG NOTTINGHAM TRENT UNI) (MECHANICAL, 2002) MSc (UTM) (MECHANICAL, 2016)
PE	ERMOHONAN MENJADI	AHLI KORPORAT
No.	Nama	Kelayakan
Ahli	-	-
KEJU	RUTERAAN KIMIA	
116661	SITI WAHIDAH BINTI PUASA	BE HONS (USM) (CHEMICAL, 2004) MSc (USM) (CHEMICAL, 2006) PhD (UiTM) (CHEMICAL, 2016)
KEJU	RUTERAAN AWAM	
116668	MOHD KHAIRUL BIN KAMARUDIN	BE HONS (UTM) (CIVIL, 2005) MSc (SURREY) (BRIDGE, 2007) PhD (SURREY) (2015)
116667	NIK KUN BIN NIK MAN	BE HONS (UTM) (CIVIL, 1992)
KEJU	RUTERAAN ELEKTRIK	AL
116662	MOHD NOOR AZIMMI BIN	BE HONS (USM)
116660	MUHAMAD HELMI BIN ABDUL MAJID	BE HONS (UITM) (ELECTRICAL, 2008)
P	ERMOHONAN MENJAD	DI AHLI (MELALUI IN PROFESIONAL)
No. Ahli	Nama	Kelayakan
KEJU	RUTERAAN AWAM	
116665	MAZLAN BIN HARUN	BE HONS (UTM) (CIVIL, 2001) ME (UTM) (GEOTECHNICS, 2019)
KEJU	RUTERAAN ELEKTRIK	AL
116664	MOHD JAILAINI BIN HARUN	BE HONS (UITM)
116663	MUHAMAD AZINUDDIN BIN DAHALAN	(ELECTRICAL, 1998) BE HONS (UNITEN) (ELECTRICAL POWER, 2003)
<b>KEJU</b> 116666	RUTERAAN MEKANIKA MOHD FAZRIL IRFAN BIN AHMAD FUAD	L BE HONS (UTP) (MECHANICAL, 2009) MSc (SALFORD) (PETROLEUM AND GAS
		2014)
	PERMOHONAN KEPAD	A AHLI 'SENIOR
N-	GRADUAT	TE'
No. Ahli	GRADUAT Nama RUTERAAN AWAM	rE' Kelayakan

JAWI

116346 ANG LYE BOON

42664 CHIANG CHUNG PING

116189 ANDERS DAMIT SINGKOD

2002)

2013)

2011)

BE HONS (UMS) (CIVIL,

BE HONS (CURTIN) (CIVIL & CONSTRUCTION, 2013)

BE HONS (UTHM) (CIVIL,

116193	DHIYA RUZANNA BINTI AB WAHID	BE HONS (UTM) (CIVIL, 2008) ME (UTM) (GEOTECHNICS,
116350	ELINAWATI BINTI MAT JUSOH	2017) BE HONS (UTM) (CIVIL - CONSTRUCTION MANAGEMENT, 2004)
116463	ISHAK BIN JOHARI	BE HONS (UTHM) (CIVIL, 2002) MTech VOCATIONAL EDUCATION (UTHM) (2003) PhD (UPSI) (TECHNICAL EDUCATION AND
116477	MOHD FAIZA BIN IBRAHIM	VOCATIONAL, 2019) BE HONS (USM) (CIVIL, 2005)
116467	MOHD SHAHRIZAL BIN MOHD NOR	BE HONS (UTM (CIVIL, 2003)
116345	RIZZA BIN ANUAR	BE HONS (UNIMAS) (CIVIL, 2010)
49475	RYLE RAYONG ANAK TANDANG	BE HONS (UiTM) (CIVIL (INFRASTRUCTURE), 2013)
KEJUI	RUTERAAN ELEKTRIK	AL
116349	AMIR FIRDAUS BIN	BE HONS (UITM) (FLECTRICAL 2012)
116465	AZANI BIN CHA'ARI	BE HONS (UTM)
116464	NASIRUDDIN BIN NASIR	(ELECTRICAL, 2011) BE HONS (UNITEN) (ELECTRICAL POWER, 2009)
116478	NORA AFZAM ABD WAHAB	BE HONS (UTP) (ELECTRICAL &
116468	ONG REE SHENG	ELECTRONIC, 2007) BE HONS (MMU)
		(ELECTRICAL, 2008)
116471	TAN MING HUI	(CIVIL, 2012)
		ME (UTeM) (MANUFACTURING
		(MANUFACTURING
		PhD (UTeM) (2021)
KEJU	RUTERAAN ELEKTRON	lik
116192	ERMAN FARIZAL BIN DAUD	BE (UMP) (ELECTRICAL
116190	FAZARUDIN BIN PAIDIN	(ELECTRONICS), 2009) BE HONS (UNITEN) (ELECTRICAL AND
116469	GOH LIND SAY	ELECTRONICS, 2010) BE (ADELAIDE) (ELECTRICAL AND
116473	HUSHAIRI BIN ZEN	ELECTORNIC, 2007) BE HONS (UNIMAS)
		(ELECTRONIC AND TELECOMMUNICATIONS, 1999)
		(ELECTRONICS AND TELECOMMUNICATION, 2002)
116466		PhD (EDITH COWAN) (2009) BE HONS (NOTTINGHAM)
110100		(ELECTRICAL AND ELECTRONIC, 2006) MSc (USM) (ELECTRONIC
116462	WIDAD BINTI ISMAIL	SYSTEM DESIGN, 2009) BE HONS
		(ELECTRONIC AND
		PhD (BIRMINGHAM)
		(ELECTRONIC AND ELECTRICAL, 2004)
KEJUI 116682	SHAIFULAZRI BIN	BE HONS (UITM)
	ZAINULABIDIN	(CHEMICAL, 2007)
KEJU	RUTERAAN MEKANIKA	L
116348	MOHD KHAIRUL HILMI BIN	BE (UNI. OF APPLIED
		(MECHANICAL, 2010) MSc (UTM) (MECHANICAL, 2018)
116470	MOHD TARMIDZIY BIN	BE HONS (UTM
116475	MUHAMMAD ZULHILMY	BE HONS (UTHM)
116472	BIN YAMAN NG TYAN YONG	(MECHANICAL, 2011) BE HONS (UTM)
116104		(MACHINERY, 1993)
110191	ZAHRA BINTI MOHD ROSLI	MECHANICAL, 2010)
116195	PHUA CHYE CHUN HENRY	(WESTERN MICHIGAN) (MECHANICAL,
116476	SHASINDRAN	2002) BE HONS (UTP)
	CLIANIMILICAM	(MECHANICAL 2011)

BE HONS (UTM) (MECHANICAL, 2000)

PERMINDAHAN KEPADA AHLI SISWAZAH No. Nama Kelayakan Δhli **KEJURUTERAAN AWAM** ABDUL MUAZ BIN ABU MANSOR MATURIDI 90251 BE HONS (IIUM)(CIVIL, 2020) 90284 ABU UBAIDAH BIN ZAINAL BE HONS (IIUM)(CIVIL 2020) AIDA FARZANA BINTI BE HONS (UTHM)(CIVIL 94196 MOHMAD SHAMSUDDIN 2020) CHAN WEI CHEW ME HONS (HERIOT-WATT 89808 UNI.)(CIVIL, 2020) BE HONS (UTHM)(CIVIL CHIA CHEONG LEONG 68721 2015) CHONG MENG KITT BE HONS (UTAR)(CIVIL, 86971 2020) 107795 CHUNDANG KEDU BE HONS (UTM)(CIVIL, 2021) FARAH HAFIFEE BINTI BE HONS (UITM)(CIVIL 33216 2010) MSc (UTHM)(CIVIL -GEOTECHNIQUE, 2013) ΔΗΜΔΠ BE HONS (UNIMAS)(CIVIL 2020) 95313 HAMIZAH BINTI PETHIE 105285 IMRAN HAFIDZ BIN MOHD BE HONS (UTM)(CIVIL FARID 2021) BE HONS (UM)(CIVIL 31204 KOK ZI YAO 2009) KUM YONG FANG BE HONS (UMP)(CIVIL 90664 20201 KWOK YOKE THENG, BE HONS (UNIMAS)(CIVIL, 77887 ESTHER 2018) 84270 LEE SHEE ZIE BE HONS (UTM)(CIVIL 2018) LEE SZE HOWE, ALVIN BE HONS (USM)(CIVIL, 27084 2008) 40301 MASTURA BINTI BUJANG BE HONS (UTM)(CIVIL 2011) PHD (UTM)(CIVIL, 2018) 33423 MOHAMMAD NABIL BIN BE HONS (UTM)(CIVIL, ISHAK 2021) MOHD AZUAN BIN ASRI BE HONS (UTM)(CIVIL, 32982 2009) MUHAMMAD HAZIQ B. BE HONS (UTP)(CIVIL 60787 MOHAMMED 2016) MBA (USM)(2019) 33300 MUNZIR AZIZI BIN BE HONS (UITM)(CIVIL, MUKHTAR 2009) BE HONS (UTHM)(CIVIL. 91207 NGU MING HUANG, DANNY 2020) NUR HAZIRAH BINTI BE HONS (UNIMAS)(CIVIL, 77837 SADONG 2019) ME HONS (UNI. OF NEWCASTLE UPON TYNE) ONG SHI XUAN 88463 (CIVIL. 2018) SAMUEL A/L BE HONS (UNITEN)(CIVIL, 87739 LEKSHMANARAJA 2019) BE HONS (UNIMAS)(CIVIL 69828 SIM JOO ERN 2017) SYED MUHAMMAD AMIRULAMIN BIN SYED BE HONS (IIUM)(CIVIL, 88202 2020) AZARIN 84591 TAN KEAN HONG BE HONS (UTM)(CIVIL, 2019) 82008 TAN TENG LUN BE HONS (UTHM)(CIVIL 2019) 99120 TANG CHOK SIL ANDY **BE HONS (SWINBURNE** UNI. OF TECH.)(CIVIL, 2021) 112751 TEO SIN-CHZE, SHANNEN BE HONS (UTM)(CIVIL, 2021) BE HONS (UNIMAS)(CIVIL 69844 WONG SIA SIANG 2017) ME HONS (HERRIOT-WATT 103767 YEU JIA YI UNI.)(CIVIL, 2021) **KEJURUTERAAN ELEKTRIKAL** AHMAD SHAHIR BIN ZAKARIAH BE HONS (UTeM) (ELECTRICAL - CONTROL, INSTRUMENTATION & 44315 AUTOMATION, 2011) 107688 CHING KAI JUNG BE HONS (UTAR) (ELECTRICAL & ELECTRONIC, 2021) CHONG RUI ZHENG ME HONS (THE UNI 69411 OF NOTTINGHAM) (ELECTRICAL & ELECTRONIC, 2017)

Note: Continuation would be published in May 2023. For the list of approved "ADMISSION TO THE GRADE OF STUDENT", please refer to IEM web portal at http://www myiem.org.my.

BE HONS (UTAR) (ELECTRICAL & ELECTRONIC, 2020)

100835 GOH WEE HOU

![](_page_46_Picture_0.jpeg)

dimensionpublishing

The Choice of Professionals

Authorised Publisher: The Institution of Engineers, Malaysia (IEM) - JURUTERA

## Explore our full set of Professional and Integrated **PUBLISHING MANAGEMENT SERVICES:**

- » Project Management
- » Creative Management
- » Ad Space Management
- » Mailing Management
- » Print Management
  - Annual Reports
  - Booklets Brochures
- Buntings
   Business Cards
  - CD / DVD Replications
- Calendars
   Cards & Invitations
- Certificates Custom Printings
  - Envelopes Folders
  - NCR Bill Books Notepads
    - Leaflets Letterheads
    - Paper Bags Posters
      - Stickers
         Others

mannan

For enquiries, please contact:

![](_page_46_Picture_22.jpeg)

dimensionpublishing
 The Choice of Professionals

#### Dimension Publishing Sdn Bhd (449732-T)

Level 18-01-02, PJX-HM Shah Tower, No. 16A, Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia. Tel: +603 7493 1049 Fax: +603 7493 1047 E-mail: info@dimensionpublishing.com Shirley Tham : +6016 283 3013 Joseph How : +6011 1234 8181

AWARDS NIGHT

IURUTER,

URUTERA

GLOBAL WARMING

GENESFIT

JURUT

![](_page_47_Picture_0.jpeg)

## Hikvision eDVR Series **engg-efficient DVR for brank for brank for brank for brank for brank for**

![](_page_47_Picture_2.jpeg)

![](_page_47_Picture_3.jpeg)

![](_page_47_Picture_4.jpeg)

**Enduring storage** Longer life and less maintenance

![](_page_47_Picture_6.jpeg)

Compact design

![](_page_47_Picture_8.jpeg)

## efficient video analytics

Motion Detection 2.0

![](_page_47_Picture_11.jpeg)

#### HIKVISION (MALAYSIA) SDN. BHD.

Unit 15-02, Pavilion Embassy Tower B, Kompleks Pavilion Ampang, 200 Jalan Ampang, 50450 Kuala Lumpur. T: 03-4811 6988 Emall: sales.my@hikvision.com

![](_page_47_Picture_14.jpeg)

Scan to learn more