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# UNDERGROUND CONNECTION

## to MRT Station

### Introduction

Basement structure was proposed as part of the extension works for AEON Maluri, Kuala Lumpur, Malaysia, which is located near to an existing MRT station, AEON Maluri MRT station. The intended purpose for the proposed basement is to have a connection between two underground structures i.e. MRT entrance and AEON Maluri for ease of public access.

AEON Maluri MRT station was completed in year 2017 before the proposed basement structure. Thus, Malaysia Railway Act 1991 shall be complied for the proposed basement excavation works, as it is within the Railway Protection Zone (RPZ). In accordance with the Railway Act 1991, permit to work within the RPZ shall be obtained from Malaysia Land Transport Authority (formerly "SPAD") with technical assessment and acceptance by Mass Rapid Transit Corporation (MRTC).

The design and construction of basement structure in compliance with the conditions stipulated in Malaysia Railway Act 1991 for Railway Protection Zone (RPZ) are as listed below: -

- i. No piling works are allowed within the First Reserve.
- ii. Pile debonding is required for foundation within the Second Reserve to avoid load transfer to the existing MRT structure.
- iii. No blasting shall be permitted.
- iv. Construction induced vibration shall be controlled at maximum peak particle velocity (ppv) of 15mm/s.
- v. Limit of distortion on the track and plinth shall not be more than 1:2000 or total movement of not more than 15mm (in any plane)

The following efforts had been made to comply with the conditions stated in the Act for RPZ:

- 1) Basement slab self-weight were transferred to an independent column rather than sitting on CBP wall, and the vertical load is subsequently supported by pile foundation with cut-off level below the influence zone of the Second Reserves;
- 2) Detailed checking were carried out on foundation cut-off level to ensure no load transfer within the influence zone of Second Reserves and pile debonding to be carried out if foundation locates within the influence zone.
- 3) Additional Instrumentation and monitoring were carried out in compliance with the Authority requirements as shown in Figure 2.

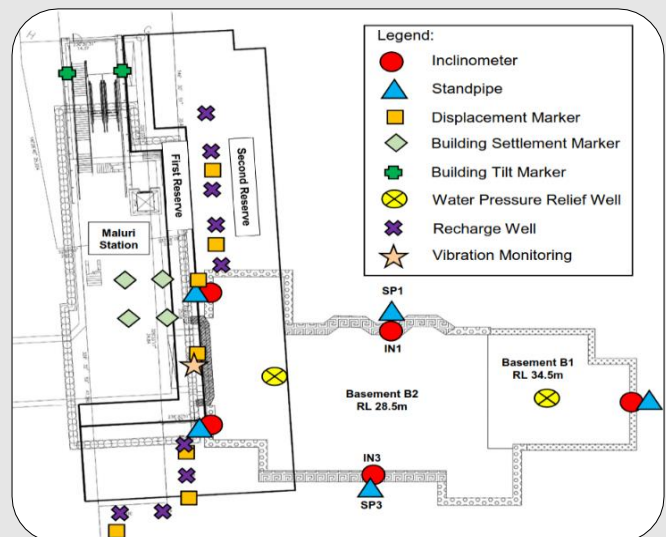


Fig. 2 Instrumentation Layout Plan

With the implemented protection works such as transfer of vertical load away from the Second Reserve Line, it has been proven to be successful through instrumentation monitoring results. Furthermore, recharge well implemented on site has also managed to control groundwater level during excavation works.

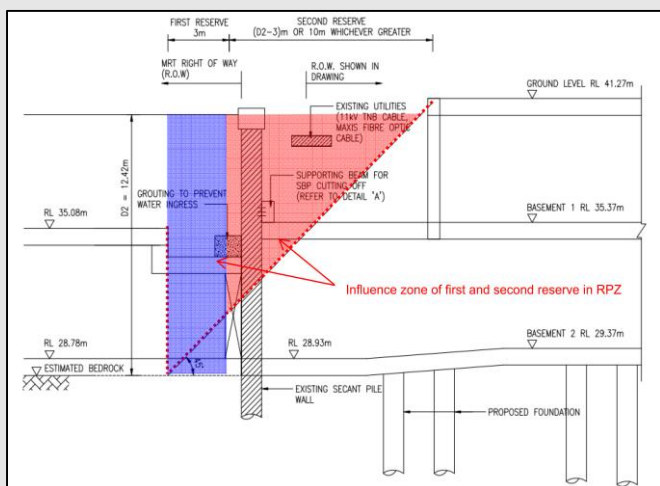


Fig.1 Demarcation of First and Second Reserves, based on Malaysia Railway Act 1991.

# Construction Sequence



Construction of Contiguous Bored Pile Wall



Commencement of Excavation Works



Installation of Temporary Strut



Excavation Works in progress



Excavation to Final Excavation Level



Construction of Above-Ground Structure

Urban areas are growing with more underground structures such as tunnels, underground stations, shafts and deep basement of buildings. Therefore, future development adjacent/connection to completed underground structures or crossing existing tunnel will become more complicated and requires proper geotechnical input to work within the constraints and limitations. To ensure public safety and railway operation, Malaysia Railway Act 1991 enforces compliance for all future development within the Railway Protection Zone, as defined in the Act. Permit to work shall be obtained from relevant Authorities/Owner in compliance with the required rules and regulations.



Ir. Koo Kuan Seng (Project Engineer)

# Agile Bukit Bintang Development

This 3.76 acres development owned by Agile Tropicana Development Sdn. Bhd. is located near the road junction of Jalan Bukit Bintang and Jalan Delima.

There are 3 phases in the development.

**Phase 1 – BLOCK B** consists of 1 block of 60-storey serviced apartment.

**Phase 2 – BLOCK C** consists of 1 block of 53-storey serviced apartment.

Both Phase 1 and Phase 2 are built on a 10-storey car park at podium levels with 2 levels of basement car park.

**Phase 3 – BLOCK A** consists of 1 block of 38-storey serviced apartment without any basement.

There are MRT tunnels passing between Block A and Block B which complicates the substructure design (design details have been published in G&P Digest Issue No.: 9). In addition to that, many other site conditions have imposed great challenges to the project, including the close proximity of existing buildings, logistic issues at prime area of Jalan Bukit Bintang, constraint of basement excavation works in between temporary struts and massive structural works. Such constraints have imposed challenges to the consultant teams and contractors, to complete the works to the developer's demands, allowable budget and tight timeline.

Advanced ETABS modeling was carried out to evaluate serviceability behaviour of the relatively slender building (aspect ratio approximately 12) under lateral wind loads and to determine the optimum shear wall thickness. Shear wall with flat slab is adopted at typical apartment floors to achieve beam free ceiling space. The simple frame enable the use of aluminum system formwork to reduce construction floor cycle to 6~7 days per floor. Shear wall system is transferred to shear wall-frame at podium to suit car park layout.



Figure 1 – 3D Sales Model

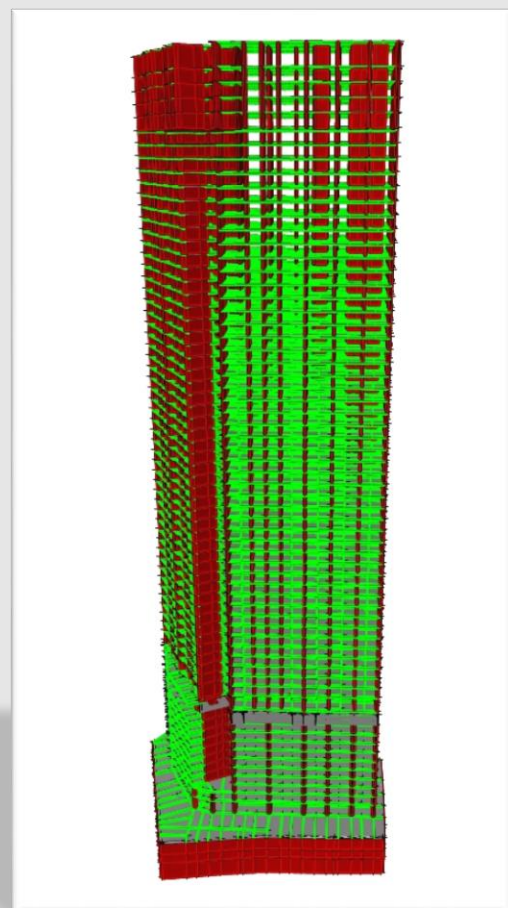


Figure 2 – ETABS Modeling For Block B (Highest Tower)

# NATIONAL WATER BALANCE MANAGEMENT SYSTEM (NAWABS) FOR BERNAM RIVER BASIN

G&P was appointed by the the Department of Irrigation and Drainage Malaysia (DID or JPS) to develop NAWABS for Bernam River Basin. The Project will take 18 months from November 2017 to May 2019.

Bernam River is an interstate river between Selangor state and Perak state. It has a length of about 200 km and a basin area of 2,855 km<sup>2</sup>.

Bernam River is the lifeblood to the 20,000 ha. Barat Laut Selangor Irrigation Scheme (BLSIS), the rice bowl of Selangor state. The water resources are also vital to meet the needs for portable water supply, horticulture, livestock farming, aquaculture and environmental conservation in the Basin. The Study Area also covers the Proton City and 80,000 ha North Selangor Peat Swamp Forest, which is the home to greatly diversify flora and fauna.

The role of Bernam River has been affected by increasing water demand, pollution and climate change. As such, an efficient water resources modelling tool will be important for the integrated planning, development and operation of the water project.



***Bernam River Headwork diverts water to BLSIS***



***Regulator at the Main Canal in BLSIS***

2018/03/23

# NATIONAL WATER BALANCE MANAGEMENT SYSTEM (NAWABS) FOR BERNAM RIVER BASIN

## Project Objectives:

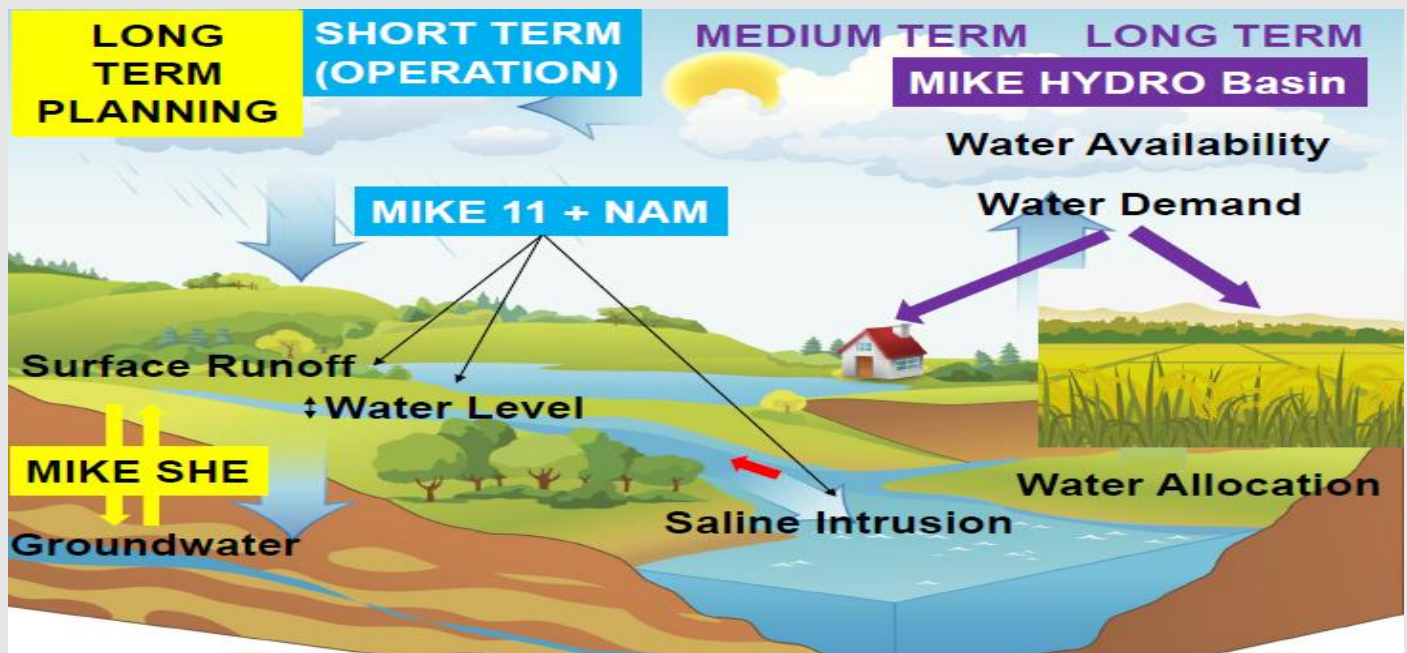
To develop a comprehensive modelling tool to support the decision makers for the planning, development and management of the water resources of Bernam River in an efficient and optimum manner under various development and climate change scenarios.

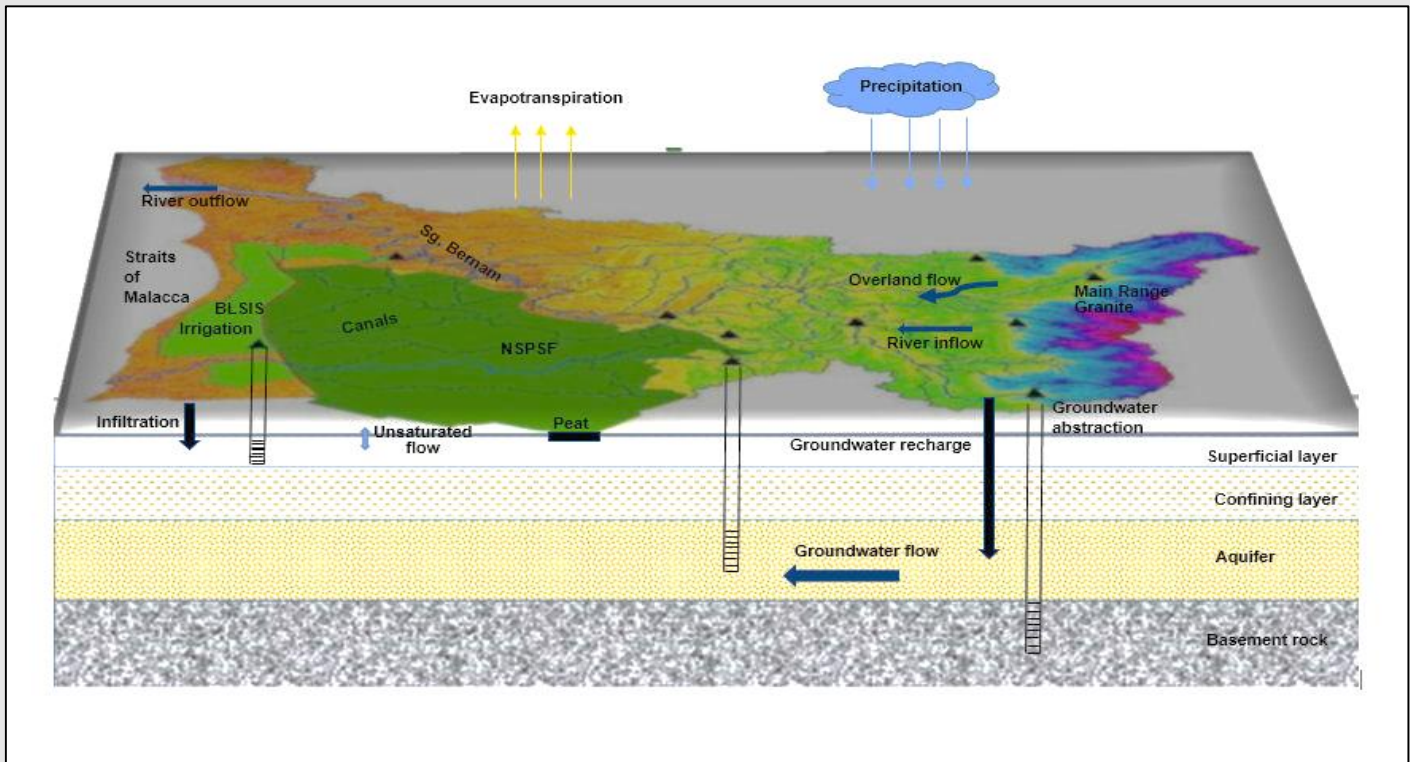
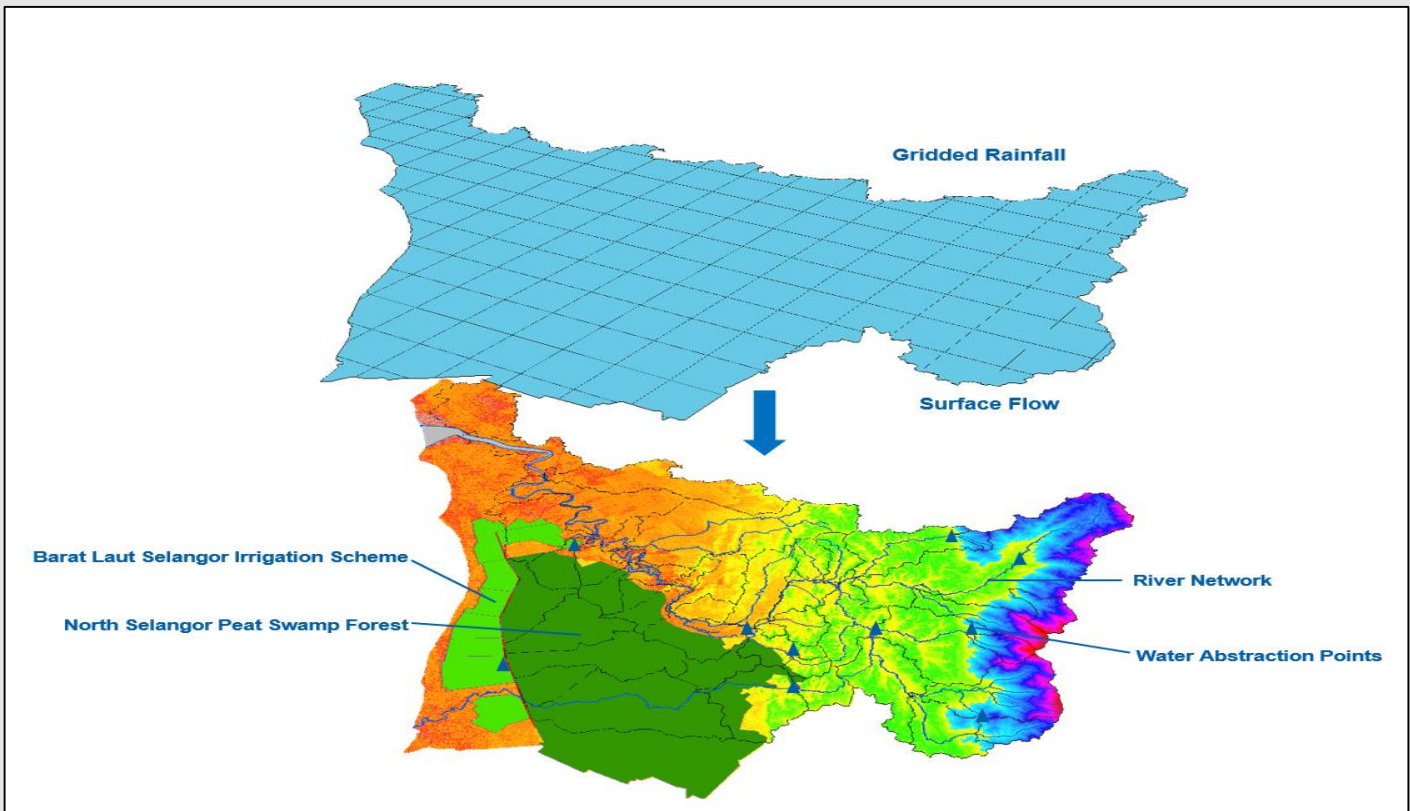
## Tools:

State-of-the-art models such as MIKE Hydro River, MIKE Hydro Basin and MIKE SHE, coupled with a Decision Management Support System (DMSS) will be utilized to simulate the existing and future water balance, considering the current and future landuse and climate change scenarios.

## Outputs:

1. Water availability – at key demand points
2. Water demand options
3. Water allocation
4. Water storages – water release and control
5. Water priorities
6. Water quality – environmental flows
7. Water audits – water use accountability
8. Water accounting – inflows and outflows
9. Water Resources and Drought index – to gauge the current and forecast status





## Overall NAWABS System and Outputs

The NAWABS Study is a complex water resources study, integrating component such as modelling of surface water and groundwater component, water demand management and water quality study, to finally deliver the water resources model to the stakeholders via a Decision Management Support System. Modelling the two important features i.e. the Barat Laut Selangor Irrigation Scheme and North Selangor Peat Swamp Forests into the modelling software are one of the many challenges in the Study as we need to ensure accurate representation of the existing operation of irrigation structures and actual site condition. To overcome this issue, numerous meetings with relevant agencies and observations at site together with field measurements were conducted to ensure the team members are able to have a full understanding of the site condition.



Ir. Yuhainis binti Kamardin (Project Engineer)



**Figure1: Overall Site Progress of RC1**

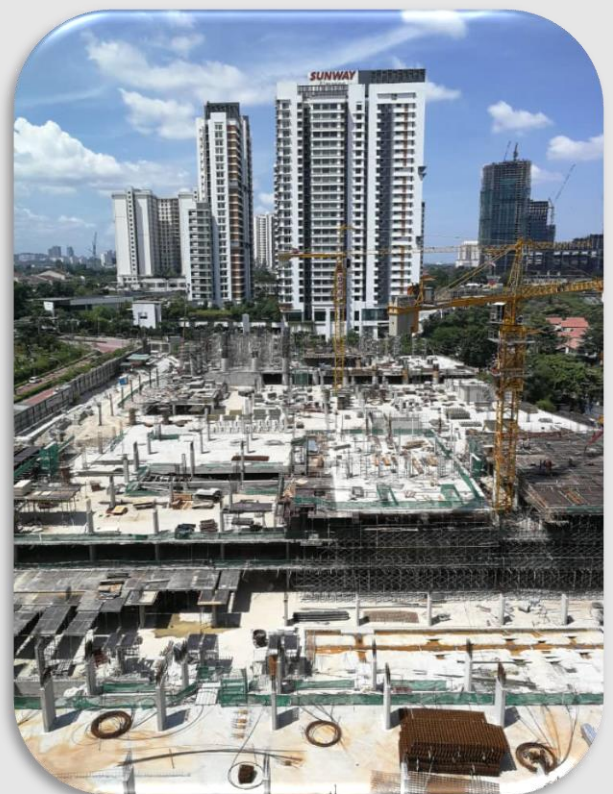
## Sunway GeoLake Residences (RC1)

A residential development which consists of 1 block of 44-storey condominium tower and 44 units of 3-storey villa on top of 3-level podium and car parks.

The proposed site is located at Sunway South Quay area (opposite of Sunway Medical Centre) and surrounded by BayRocks Garden, A'Marine Lakeside Condominium, Sunway Geo Residences and Sunway GEO Avenue. This site can be accessed via Jalan Lagoon Selatan and Persiaran Tasik Timur.

G&P was engaged by Sunway South Quay Sdn Bhd as geotechnical consultant to provide full geotechnical consultancy services.

As this site is located in karstic limestone formation, cavity probing & treatment works were carried out and followed by piling works. In year 2018, substructure works were successfully completed and main building works are currently on-going.

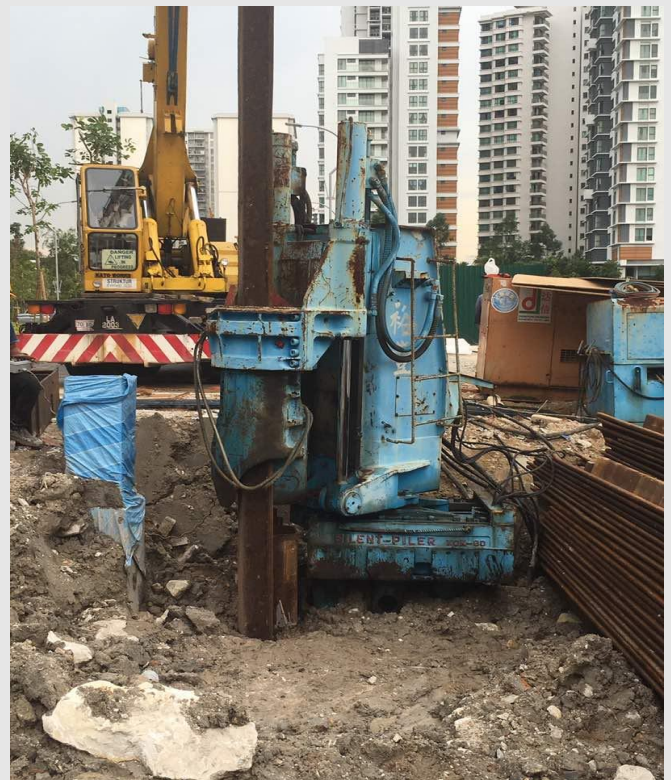




# Site Construction



Bored Piling Works



Installation of Permanent Sheet Pile



Completion of Sub-structure Works

The challenges of this project are in its karstic limestone nature, where bedrock levels change significantly even within the same pile group. Cavity probing and treatment works were carried out to ensure all bored piles are founded on sound bedrock. Besides that, the presence of the soft to very soft top soil layer created additional difficulties in allowing stable piling platform to be formed due to previous usage of the site as dumping ground. Due to these challenges, during construction stage, we as the design team worked closely with the Contractor to ensure all substructure works are being carried out safely and successfully.

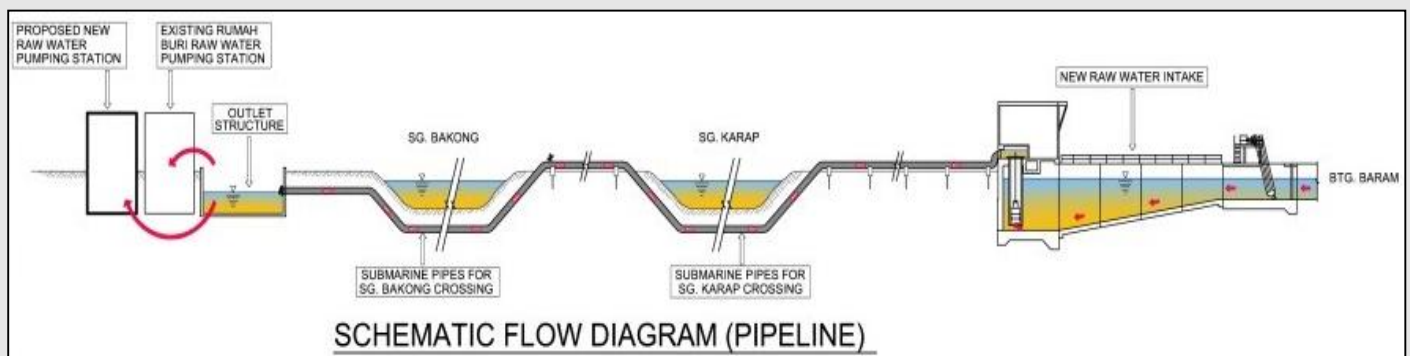
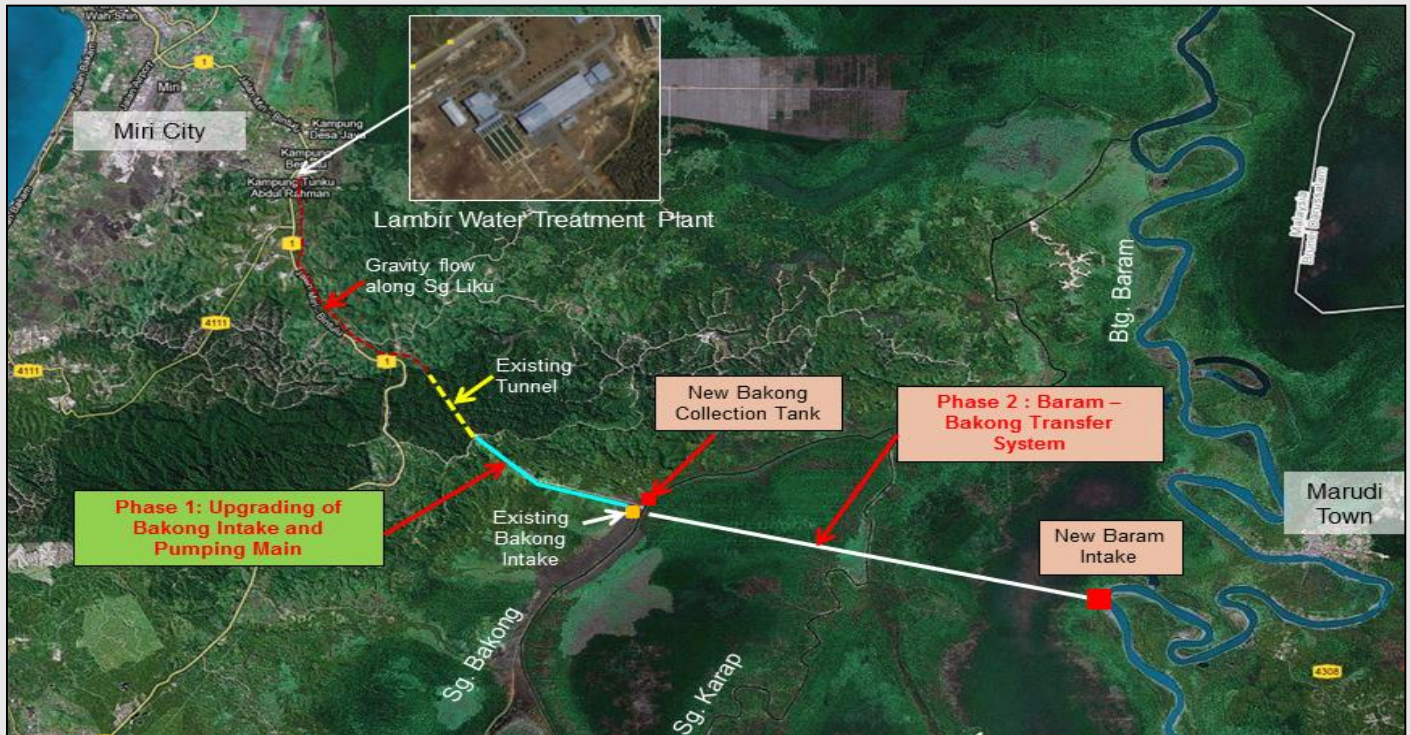


Mr. Kwang Kim Lup (Project Engineer)

# Miri Water Supply Source Development Phase 2

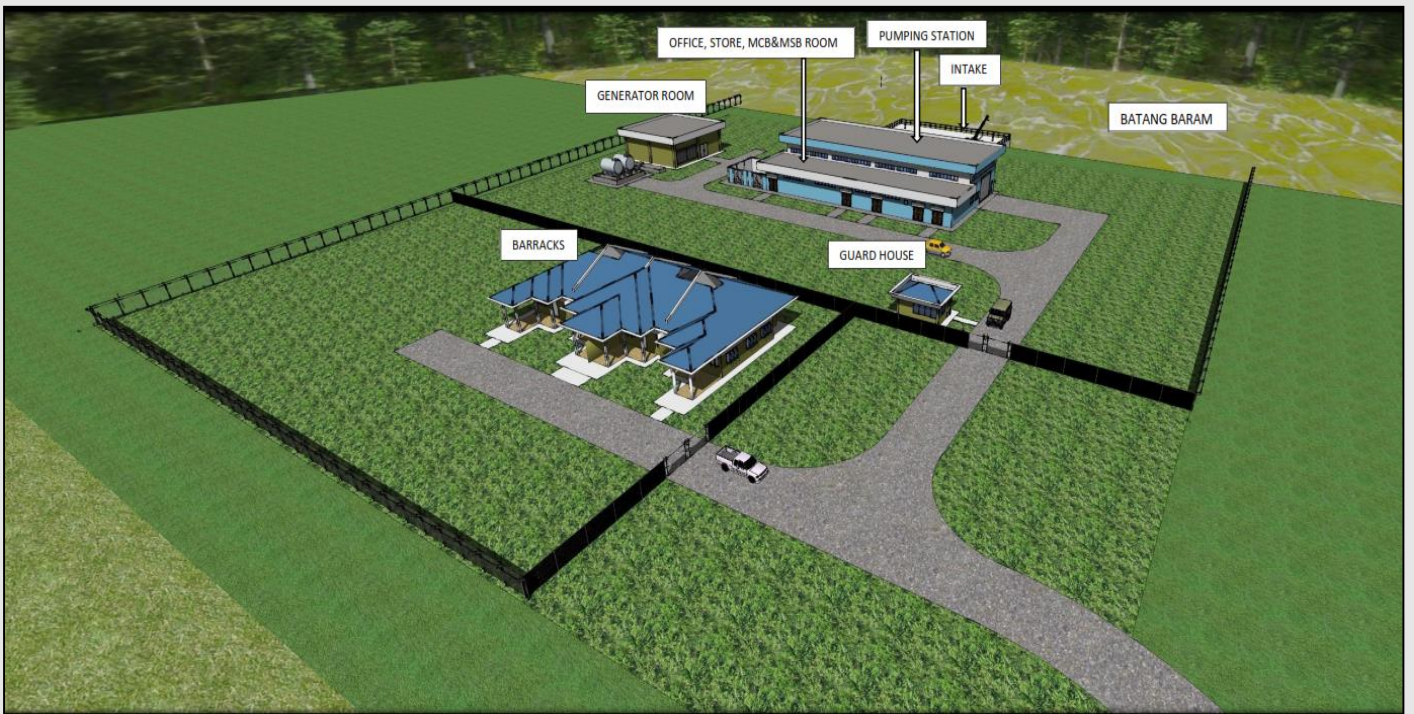
## Introduction

The Sarawak Government with the objective of developing the future water supply of Miri City and its surrounding area has initiated the raw water transfer scheme from Batang Baram to Sg Bakong Collection Tank which will eventually discharge into Sungai Liku. It is the largest raw water transfer project at the Northern Region of Sarawak at 300 MLD with a raw water pumping main of 1600mm diameter at approximately 16km length.



### The major components of the project are:-

- **Batang Baram Site;** - Intake Structure and Linked Buildings, i.e. Office, MSB Room and Store. Genset Room, Barracks, Guard House, Ground Treatment Works, Road, Drainage, Mechanical and Electrical Works is required to cater for 300 MLD pumping capacity.
- **Sg Bakong Site;** - Intake Structure and Linked Buildings, i.e. Office, MSB Room and Store. Genset Room, Barracks, Guard House, Water Piping Inter-Connections Works, Earthworks, Road, Drainage, Mechanical and Electrical Works is required to cater for 180 MLD pumping capacity.
- **Batang Baram Site to Sg Bakong Site;** - 16km of gravel surface service road and 16km of 1600mm Dia. MSPUL Pumping Main with 2 submarine crossing at Sg. Karap and Sg. Bakong.



**Batang Baram Site**



**Sg Bakong Site**

The project is located on soft ground which consists of a layer of peat soil with thickness ranging from 2m to 11.5m overlaying 55m thick soft clay with SPT-N values less than 5. Prefabricated Vertical Drains with surcharge is proposed as ground treatment for Batang Baram Site. Basal geotextile and stability berm were also proposed to cater for the stability of high fill embankment. Both intake structures will involve deep excavation in soft soil up to 8m, as well as works below the normal water level. Therefore, temporary works will be the major challenges of this project.



Ir. Khoo Hui Kwang (Project Engineer)



**NEWS FLASH @ G&P**

Award presented by the  
Minister of Works YB Baru Bian

## **Dato' Ir. Dr. Gue See Sew: Recipient for the Award of Excellence Engineering, Construction & Property**

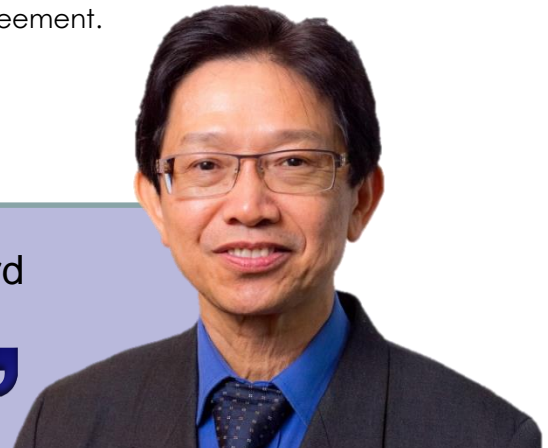
Dato' Ir. Dr. Gue See Sew, becomes highlight of the night in the 45<sup>th</sup> BIM Anniversary Dinner 2018, when he received the Award of Excellence for Engineering, Construction & Property.

As CEO of G&P Professionals Sdn Bhd, a one-stop value-adding professional engineering consultancy service and currently ranked number five in the country in terms of staff strength, Dato' Ir. Dr. Gue S. S. plays his role in the professional industry particularly through the Institution of Engineers, Malaysia in various position paper committees to improve engineering practice and boost public and environmental safety. He was also Chairman of the Technical Committee on Geotechnical Standard for four Malaysian Standards of the Construction Industry Development Board in 1998, and developed the four Malaysian Standards for Site Investigation, Earthworks, Laboratory Testing and Foundation Design.

As a professional engineer with firm knowledge and vast experience, he was appointed by the Governor of Penang to lend his expertise in two Commissions of Enquiries in 2013 and 2017 and by the Minister of Transport to be a member of the Independent Safety Committee of KLIA2.

He is also recognised by the Industry with numerous accolades such as the Construction Professional of the Year 2006, CEO of the Year 2017 and SME icon 2017.

In the regional and international arenas, he was the Chairman of APEC Engineers Register from 2001 to 2005 and 2007 to 2011; and is currently the Chairman of the International Professional Engineers Agreement.



**“ I am humbled to receive this prestigious award and wish to share this success with all my colleagues at G&P and IEM. ”**



## Christmas Party 2017

Christmas Party being a G&P annual event was held on 21<sup>st</sup> December 2017. Some of the highlights were caroling, mini games, lucky draw as well as a memorable gift exchange session. The event was full of joy fun, cheerful and exciting moments.



## G&P Olympics 2018

This year we have our staff participating in various games including bowling, badminton, basketball, ping pong, etc. The joyful photos taken of our winners are shown below:

- 1 Ping Pong Matches – Mix Double
- 2 Football Matches – Champion Team
- 3 Basketball Matches – Champion Team
- 4 DOTA Matches – Champion Team
- 5 Bowling Matches – Champion Team
- 6 Badminton Matches – Men's Double



# G&P's 18<sup>th</sup> ANNIVERSARY DINNER



Four Points by Sheraton

## WORDS FROM OUR CEO

### Dato' Ir. Dr. Gue See Sew:

Fellow directors, respected colleagues, dearest families and friends, good evening and a very warm welcome to G&P's 18<sup>th</sup> Anniversary Dinner. Thank you very much for gracing this special night with our G&P families.

Gue & Partners Sdn Bhd. has evolved into G&P Professionals Group and now we provide one-stop engineering consultancy services. Currently we have staff strength of 324.

Many of our firms in the Group are still recruiting. I am pleased to update you all that we have been appointed and are working on the following mega projects :

- Detailed design for 13.5km of the underground tunnel section of MRT 2
- Geotechnical Reference Design for 5 Station of HSR
- GIR for ECRL
- Reclamation for 600 acres at Melaka Gateway.

Dear colleagues, I believe one of the main reasons of G&P becoming prominent as preferred consultant and securing many mega projects are our four core values :

- Structured QA/QC
- Structured Training
- Structured R&D
- Structured Sharing

These core values allow us to improve for betterment of the company and staff as well as our clients and their projects. For a new similar project, we do better with more value engineering. We need to continue to polish our core values and make it shine and as a habit of our work. We will strive towards greater heights.

With these core values, I am certain that G&P will continue to get mega projects if we continue to add value to our clients and their projects.

Last but not least, special thanks to Ooi Qi Wei, organising chairman and his sports club committee members in making G&P's 18<sup>th</sup> Anniversary Dinner a success. I thank you all for gracing this momentous event and please have a pleasant and enjoyable evening.



# G&P's Footprints

## 20<sup>th</sup> February 2018

Senior Director, Ir. Liew Shaw Shong was officially invited as one of the new Industrial Advisory Panels for 2018 – 2020 by University Teknologi PETRONAS.

## 12<sup>th</sup> March 2018

Our Director, Ir. Chow Chee Meng is re-appointed as member of Industrial Advisory Panel (IAP) for the Bachelor of Engineering (Hons) in Civil Engineering degree, offered by the Faculty of Engineering and Built Environment, SEGI University for the duration from 1<sup>st</sup> April 2018 to 31<sup>st</sup> March 2023.

## 21<sup>st</sup> March 2018

Senior director, Ir. Dr. Tan Yean Chin, was invited as Guest of Honour for UTAR (University Tunku Abdul Rahman) Convocation on 11<sup>th</sup> March 2018.

## 29<sup>th</sup> May 2018

Senior director, Ir. Dr. Tan Yean Chin was interviewed by Phoenix Television on the view of engineering aspects for High Speed Rail (HSR) Malaysia.

## 24<sup>th</sup> July 2018

Our CEO, Dato' Ir. Dr. Gue See Sew was awarded the Professional Excellence Award for Engineering, Construction & Property by Balai Ikhtisas Malaysia (Malaysian Professional Centre) at Sheraton Hotel, Petaling Jaya.

## 27<sup>th</sup> September 2018

Senior Director, Ir. Liew Shaw Shong was invited as Guest Lecturer to Mathematics and Science Fair (MSF) 2018 for Universiti Tunku Abdul Rahman Sungai Long Campus.

## G&P Digest's Editorial Board

We are honoured to be appointed as the editorial team of G&P Digest Issue No. 11, and are pleased to present engaging contents for our reader's reading pleasure. We hope to update our readers with G&P's news, and at the same time keep our readers abreast with some of the notable construction projects in Malaysia.

Besides, the editorial board would like to take this opportunity to express our gratitude towards the project team of "AEON Maluri (Underground Connection to MRT Station)" (Ir. Dr. Tan Y.C., Ir. Koo K.S., Mr. Chee F.W.), "Sunway RC1" (Ir. Chow C.M., Mr. Kwang K.L.), "Agile Bukit Bintang Development" (Ir. Steven Ng T.K., Mr. Tan B.C, Mr. Low E.T., Ms. Goh L.Y.), "Miri Water Supply Development Phase 2" (Ir. Kho L.K., Ir. Khoo H.K., Mr. Lawrence Lee) and "NAWABS" (Ir. Chong S.F., Ir. Yong S.F., Ir. Lim S.P., Ir. Lim C.K., Ir. Yuhainis Binti Kamardin) for their contributions.



### Editorial Board of G&P Digest Issue No. 11

(From left: WH Ng, Derrick Tan, HY Kwan, Cheang Yee, Dr. SY Wong)



Ir. Dr. Tan Yean Chin presenting his speech as the Guest of Honour for UTAR Convocation.

# CORPORATE PROFILE

G&P Professionals Group consists of the following specialist engineering consulting firms that provide a wide range of quality engineering services:

- G&P Geotechnics Sdn. Bhd.
- G&P Structures Sdn. Bhd.
- G&P Infra Sdn. Bhd.
- G&P Claims & Contracts Sdn. Bhd.
- G&P Project Management Sdn. Bhd.
- G&P Water & Maritime Sdn. Bhd.
- G&P R International (Cambodia) Co. Ltd.
- G&P Highways & Transportation Sdn. Bhd.
- G&P Dams & Water Services Sdn. Bhd.
- G&P Professionals (Sarawak) Sdn. Bhd.
- NGI - G&P Sdn. Bhd.
- G&P Water (Singapore) Pte. Ltd.
- G&P - AA International Consultant Joint Stock Company, Vietnam
- G&P Professionals (Sabah) Sdn. Bhd.
- G&P R&D Sdn. Bhd.
- G&P M&E Sdn. Bhd.

The Group has a fast expanding pool of highly qualified and experienced Geotechnical, Civil & Structural, Mechanical & Electrical, Infrastructure, Maritime, Water, Highways, Railways & Transportation and Dams Engineers, Engineering Geologists and technical support staff.

The Group has several associated organisations overseas where value added is further enhanced. The project activities are handled by the specialists within the Group that explores innovative and economical solutions tailored to the needs of the projects. Our research and development culture has ensured that our services are always at the forefront of world trends.

## Associated Organisation



Norwegian  
Geotechnical  
Institute  
Norway

## STAFF STRENGTH (Year 1999 - 2018)



### G&P Professionals Sdn Bhd

Wisma G&P  
39-5, Jalan Tasik Selatan 3,  
Bandar Tasik Selatan, 57000 Kuala Lumpur, Malaysia.  
Tel : 60(3) – 9054 1612 /9059 5396  
Email: gnp@gnpgroup.com.my

Fax : 60(3) – 9059 5869

[www.gnpgroup.com.my](http://www.gnpgroup.com.my)

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