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PP19040/06/2016 (034532)

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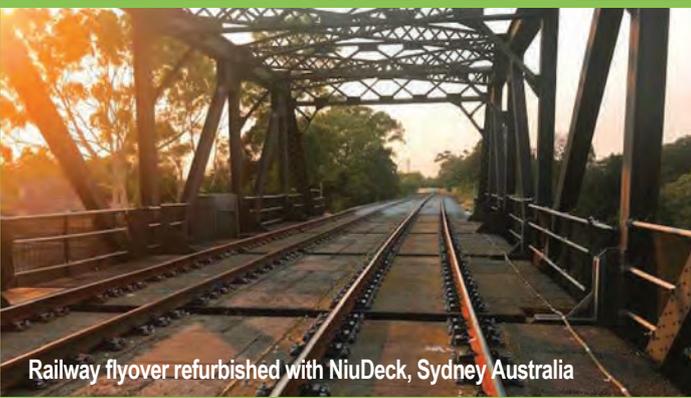
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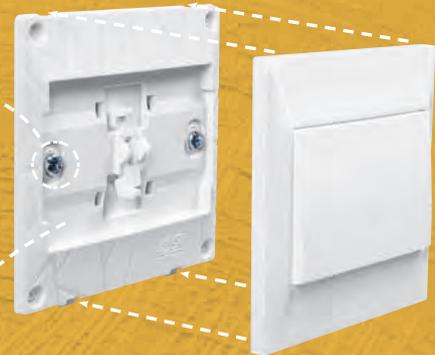
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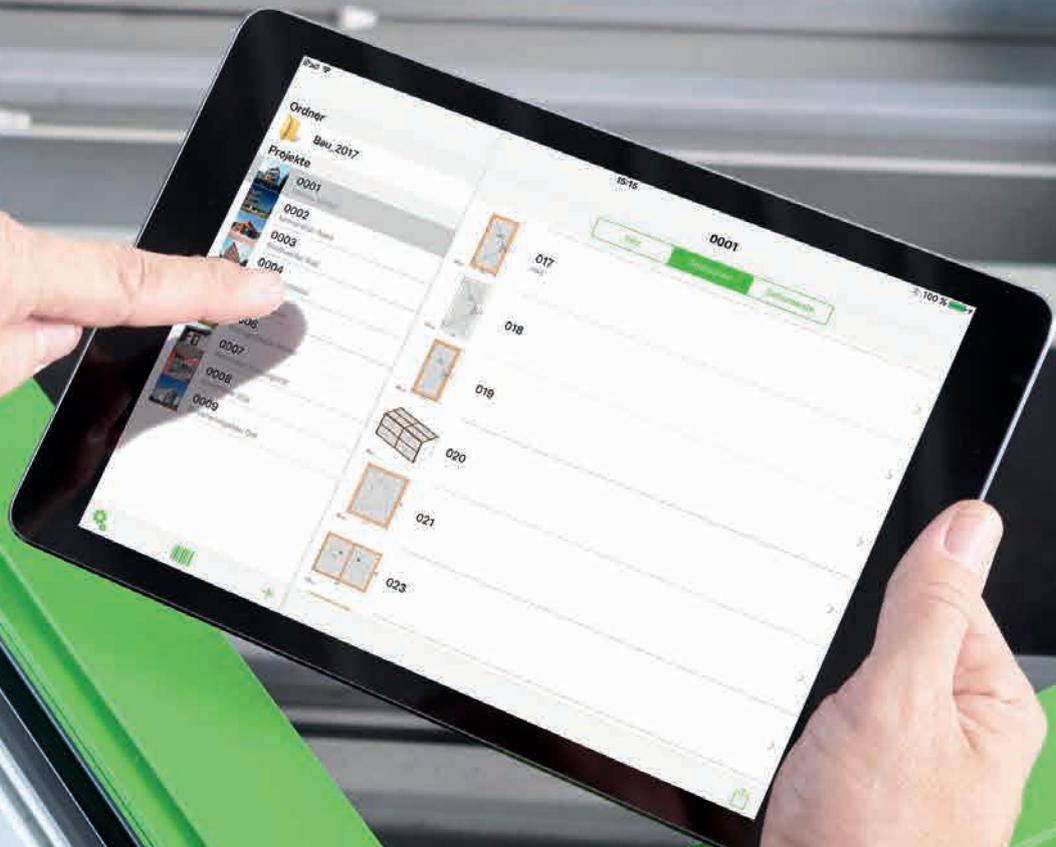


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Publication frequency: Quarterly (4 issues per year)





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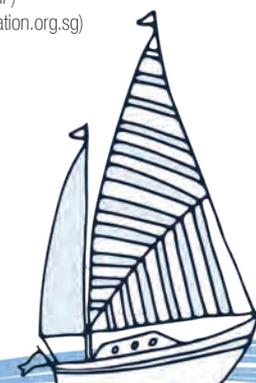
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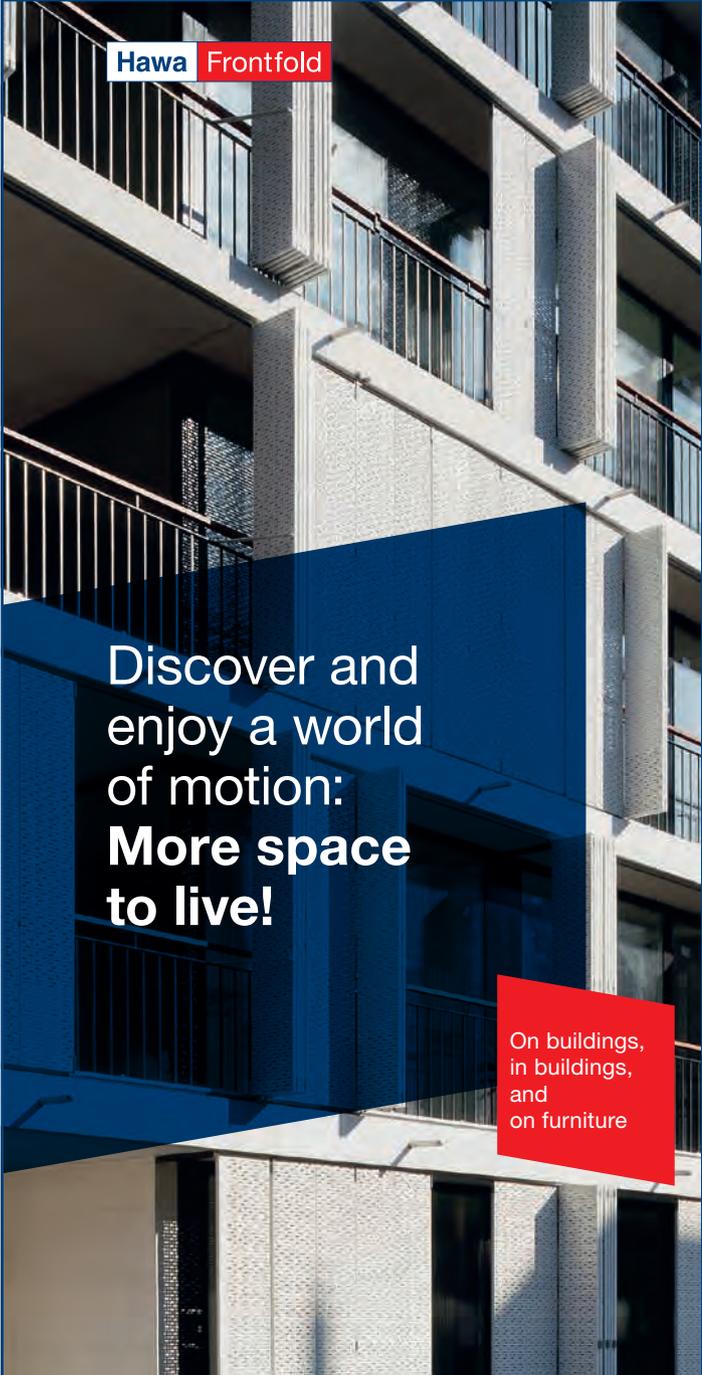


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## **Congratulations to *Construction+* magazine on your March 2020 theme of Reducing Construction Waste with an eye on sustainable technologies and materials.**

In 2018, the Penang State Government launched an ambitious action plan named Penang2030: A Family-Focused, Green and Smart State that inspires the Nation, to enhance quality of life; improve household incomes; empower people to strengthen civic participation; and invest in the built environment to improve resilience.

As a major step towards this Penang2030 vision, the Penang Green Council has formulated the Penang Green Agenda, which is a three-year policy realisation project, aimed at implementing strategies to build a resilient community in the state to meet and adapt to future environmental challenges by the year 2030. The plan successfully took off with the participation of 10 working groups whose output has since been compiled to be executed this year, accompanied by a series of public engagement sessions.

Penang is very vulnerable to climate change. Heat stress has been identified as a new challenge for urban areas and we are transitioning from not being at risk to becoming endangered by 2050. The average temperature in Penang is predicted to rise by 1.5 degree Celsius by 2030. Hence, environmental projects such as Green connectors are specifically designed to reduce surface temperatures, promote air circulation, decrease urban island heat effect and reduce flooding by adopting a sponge city approach.

As such, by also reducing construction wastes to complement these measures, Penang stands to benefit from lower CO2 emissions and minimise the effects of hazardous or nuisance wastes. Innovation in sustainable technologies and materials will further reinforce Penang's commitment to become a more responsible Greener state that is expected to shore up the community's resilience to meet and adapt to environmental changes by 2030.

In my capacity as Penang Chief Minister, Penang2030 is my invitation to everyone who is concerned about the well-being of the state. The Penang government welcomes discourse and engagements from private sectors, academics and individuals to formulate strategies in the coming years.

We're grateful and we welcome the media, especially well-read ones like *Construction+* magazine, to support our cause, report on and disseminate the outcomes of our public engagement sessions.

**YAB Tuan Chow Kon Yeow**  
Chief Minister of Penang cum Chairman of Penang Green Council

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Dear readers,

A report released by GlobalData states that construction in Southeast Asia will increase by more than 6 per cent per year until 2022. Data released by Arcadis shows that construction industries in the Philippines and Vietnam are ranked third and fifth worldwide, whereas Indonesia ranked sixth. Construction in Thailand, Malaysia and Singapore is not developing as rapidly as the former three, ranking 13<sup>th</sup>, 15<sup>th</sup> and 24<sup>th</sup>, respectively. Despite the wide variations of growth in 2019, in general, construction output in Southeast Asia has continued to expand.

The spread of COVID-19 since December 2019 might have delayed some projects, slowed down delivery and affected labour availability as quarantine is needed in some countries, but most construction projects are still continuing nonetheless. Long-term impacts of the situation on construction is yet to be determined, but thus far, many projects remain in progress.

The construction development in Asia is supported by good economic growth and stable political climate, especially in Malaysia and Singapore. However, the industry has also affected the amount of natural resources used, which in turn increases the generation of construction waste. This issue highlights the use of sustainable materials and advanced technology as ways to minimise and manage construction and demolition (C&D) waste.

The commentary section provides an overview of the current state of C&D waste management in Southeast Asia. Some of the projects featured in this issue, including those in Malaysia, Singapore, Thailand and the Philippines, were designed with sustainability in mind. This is reflected in the use of alternative materials such as bamboo and the application of open plan strategies that maximises material utilisation.

Sustainability must be part of construction in order to ensure the preservation of the natural environment. However, with the current situation, health and safety in construction industry should also be a priority. With major construction projects still in progress amidst the current situation, we hope that workers' health and safety will continue to be safeguarded.

Happy reading!

**Anton Adianto**  
Senior Editor

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Chief Minister of Penang cum  
Chairman of Penang Green  
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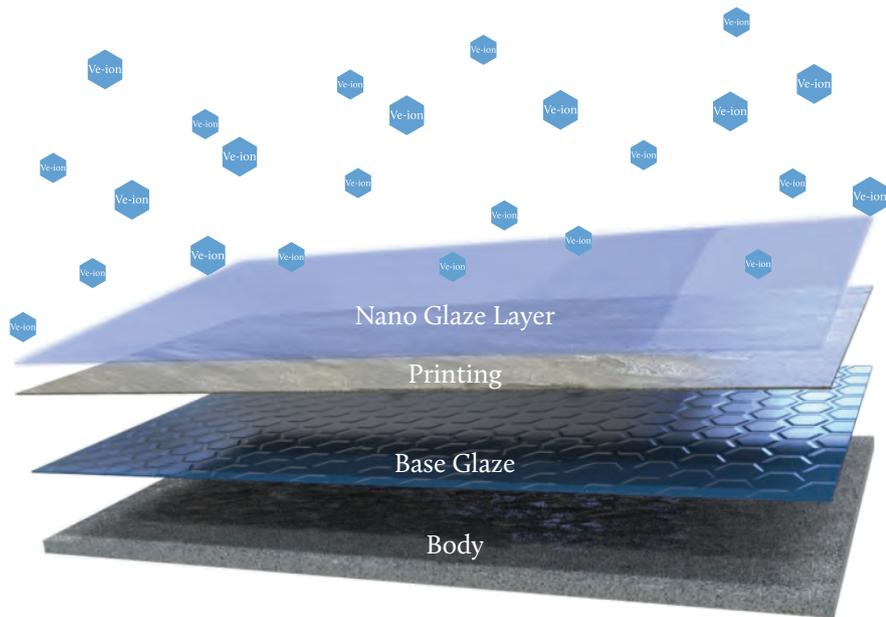
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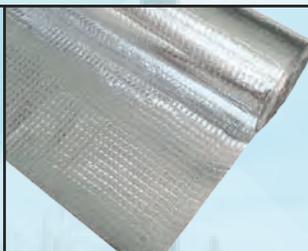


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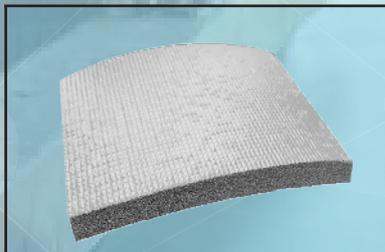
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# A SNAPSHOT OF CONSTRUCTION WASTE MANAGEMENT IN SINGAPORE

By Candice Lim

In Singapore, where natural resources are scarce, technology is used to create usable materials or improve on processes in industries where immense quantities of resources are required, such as in construction. The treatment of incineration bottom ash (IBA) or slag created via gasification has also opened doors to using it as an alternative material in construction, potentially replacing the need for sand. Rising temperatures and more erratic weather patterns from climate change will worsen resource constraints and supply shocks.

Singapore has created Newsand from repurposed municipal solid waste, and it may be used in construction in the country. It is hoped that this material will help to close the waste loop and extend the lifespan of Singapore's landfill on Semakau Island. Newsand can currently be made from IBA. Trials and tests will be conducted, with small-scale constructions being put in place to experiment with this material. The National Environment Agency said 3,000 tonnes of IBA generated from the waste-to-energy plants in Singapore will be collected and treated for use as a road base or sub-base material in road construction projects. These efforts are a culmination of efforts over the years to turn trash into resources and close the nation's waste loop.

Singapore has had some success, recycling 60 per cent of its waste since 2012 by focusing on individual waste streams. This has led to a nearly 100 per cent recycling rate for Construction and Demolition (C&D) waste, as well as ferrous and non-ferrous metals.

## HOW C&D WASTE IS PUT BACK INTO BUILDINGS

The Demolition Protocol was implemented by the Building and Construction Authority (BCA) to help demolition contractors plan their procedures to maximise C&D waste recycling. Under this protocol, reusable and non-reusable parts of a building have to be identified before separately dismantled and removed. Reusable parts (including piping and wiring) are separately binned and sent to a recycling facility. Non-reusable parts (such as ceiling boards and tiles that contaminate the concrete debris) are discarded. Demolition starts only when the building has been stripped to its bare frame. This protocol has led to the development of several new materials, such as recycled concrete aggregate (RCA), which is made up of 70 per cent demolition waste that is reclaimed from waste concrete made with natural aggregates. The C&D waste undergoes a preliminary process where ferrous metal are crushed and removed, followed by removal of foreign materials such as bricks, plastics and asphalt. Thereafter, RCA will be further crushed and screened into various sizes, eventually resulting in a stockpile of RCA for various usage. For instance, Samwoh Corporation's Eco-Green Building was constructed using concrete with up to 100 per cent recycled construction aggregates.

Sources:  
Zero Waste Master Plan by the Ministry of the Environment and Water Resources  
<https://www.straitstimes.com/singapore/newsand-from-processed-waste-may-be-used-in-construction>





Construction and demolition waste



# CONSTRUCTION WASTE MANAGEMENT AND MINIMISATION IN SOUTHEAST ASIA: AN OVERVIEW

By Anisa Pinatih

With construction waste piling up at an alarming rate in Southeast Asian countries, effective management and minimisation programmes are imperative. Resources recovery such as reuse and recycling should be coupled with prevention of waste generation that reduce virgin material extraction. The use of sustainable materials and advanced technology are among the most promising solutions. High-income countries such as Hong Kong and Singapore take the lead in the region. Indonesia and Malaysia have also adopted similar sustainable practices, despite facing some challenges.

## CONSTRUCTION AND DEMOLITION WASTE

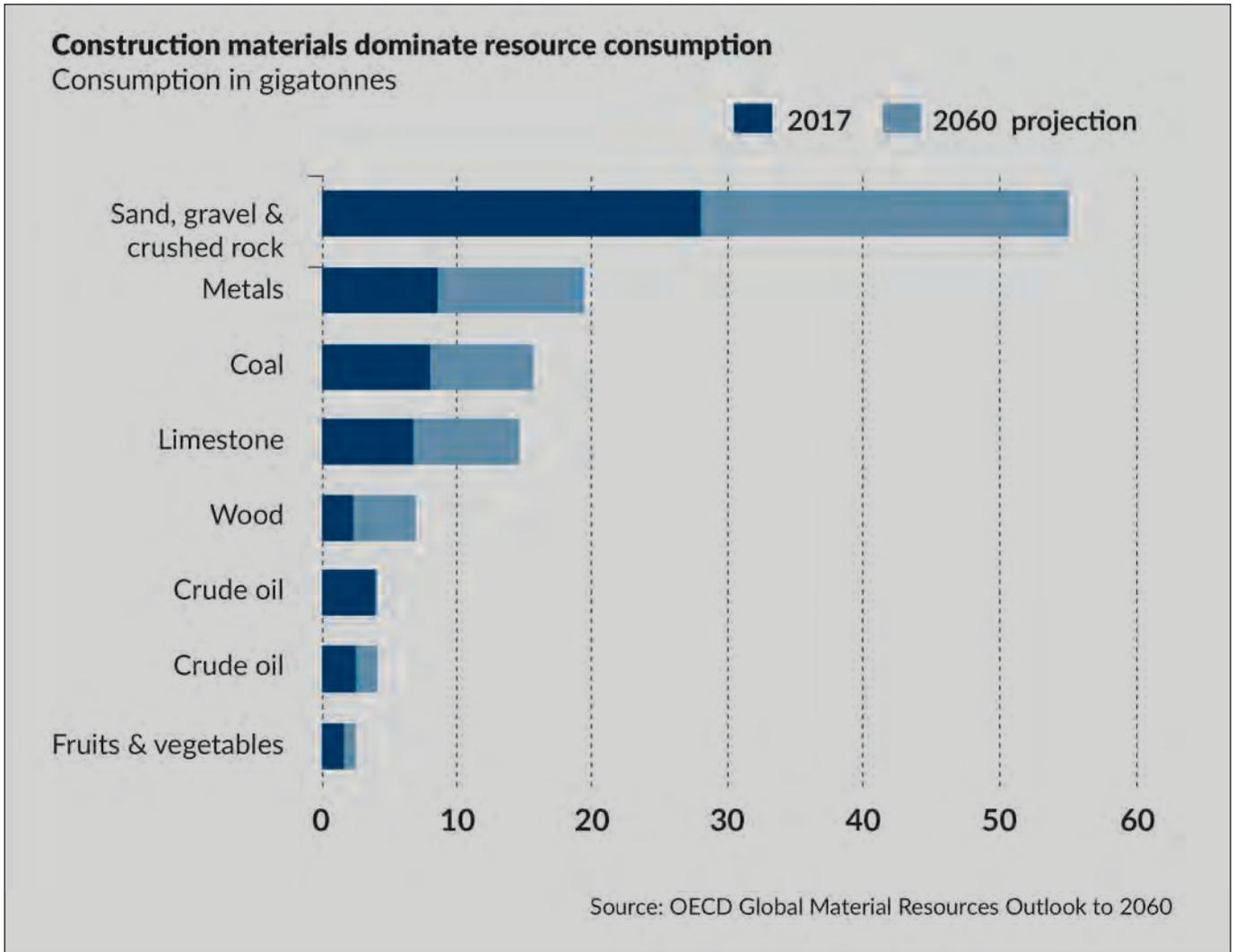
Construction and demolition (C&D) waste is made up of components such as concrete, stonework, wood scraps, metallic waste like cables and pipes, asbestos, brick, tiles, ceramics, gypsum, tar and coal tar, plastics and many others. These are by-products of construction, demolition or renovation of buildings that continue to pollute the environment.

Report by the World Bank in 2012<sup>1</sup> says that annual global solid waste generation is 1.3 tonnes and this is predicted to soar to 2.2 tonnes per year by 2025. Building

materials account for 50 per cent of this annual global solid waste. The World Bank 2018 report<sup>2</sup> confirms that the waste is reaching 2.01 tonnes per year, with 33 per cent not being managed properly.

Real measures should be taken to reduce and to mitigate the negative impacts, but waste treatment worldwide is poor. The World Bank report in 2018 further states that the most common ways to dispose waste are in open dumps and unspecified (most probably uncontrolled) landfills. Recycling waste takes up only 13.5 per cent; and other more sustainable methods i.e., sanitary landfills, composting and controlled landfills occur at only 7.7, 5.5 and 4 per cent respectively.

In addition, the construction industry also consumes high energy and extracts raw materials on a large scale. UN Environment's Global Status Report 2017<sup>3</sup> states that the industry uses 36 per cent of the total world's energy. The Global Material Resources Outlook 2060<sup>4</sup> predicts that minerals' extraction will continue to rise, especially for construction in developing economies, including the Southeast Asian countries.



Current and projected resource consumption by construction industry

## Construction industry extracts a large amount of virgin material and produces a high level of C&D waste.

The extraction of sand, gravel and crushed rock will reach 55 giga tonnes by 2060; while metal, coal, limestone and wood will also double.

With the circular economy agenda being promulgated worldwide, these extraction and utilisation processes should be coupled with sustainable waste management. The recycling industry, as argued by the World Circular Economy Forum, is indeed growing and will be more

competitive, but the scale is too small compared to the mining sector (making up only one tenth of global GDP share).

### WASTE MANAGEMENT HIERARCHY: WHERE DOES IT START?

Needless to say, C&D waste has detrimental impacts on the environment as well as other aspects, including health and the economy. As the world becomes increasingly concerned about climate change, both developed and developing

nations are urged to manage C&D waste properly. Countries in Southeast Asia imposes stricter law; for example, Malaysia drafted RM5 million (US\$ 1.6 million) for environmental offences.<sup>5</sup>

The most common ways to reduce C&D waste is by reusing and recycling, but these do not discourage the generation of waste—only solving the problem and not preventing it. C&D waste can also be generated by faulty design processes, ineffective planning, miscalculations, or by mishandling the materials. If the design and site practices are improved, waste should also be minimised from the outset.

Waste management hierarchy proposed for developing nations in Asia<sup>6</sup> shows that the first order in the hierarchy of waste management should be reducing, so discarding will be the last option. When materials do get discarded, it is then recovered by repurposing, reusing or recycling.

Waste segregation plays an important role in many Asian countries, especially by the informal sectors. This could be improved by providing facilities and safe environments for waste pickers. Secondary materials industry is growing rapidly because of increasing demand. However, the high labour and technology costs in secondary materials production, as reported by OECD Global Material Outlook 2060, means that this industry will not outpace the primary material industry anytime soon.

### Waste Management in Southeast Asia: Snapshots from Hong Kong, Malaysia & Singapore

Treating construction waste, or just waste in general, needs strong budgeting and this is where the trouble lies. Finance remains a challenge in most Southeast Asian countries, both for initial investments and operational procedures that include collecting, transporting, sorting, treating, and ultimately distributing the produced recycled materials and discarding the ultimate waste.



The production of mud blocks consumes 70 per cent less energy compared to burnt bricks

Sustainable waste management is indeed closely related to a country's economy<sup>7</sup>. Low-income countries spend significantly less on waste management than high-income countries, because the take-on is labour intensive and costly. Many international organisations provide funding to assist solid waste management, such as the World Bank that has given more than US\$4.7 billion to over 340 initiatives around the world<sup>8</sup>.

To illustrate how waste management is practiced in countries with different income levels in Southeast Asia, we could look at Hong Kong, Malaysia and Singapore. By considering the GNP per capita and populations, Hong Kong is considered as a high-income economy, whereas Malaysia is considered as an upper-middle income economy (World Bank, 2020). Research by faculty members of Universiti Teknologi MARA<sup>9</sup>, Malaysia, that compares the practices in Hong Kong and Malaysia concludes that Hong Kong's practices

have a more positive outlook because of the legal instruments and treatment methods in place. Part of the findings is presented in the table. Data about Singapore is added for the sole purpose of this commentary.

The legal act in Hong Kong covers more areas. It reuses materials and abandons incineration. Inert material is sent to public filling that is subsequently used for reclamation; and decomposable organic waste is taken into the main waste disposal stream. Meanwhile, Malaysia has a recycling scheme, but it is not a priority practice, with rates falling back at merely 5 per cent<sup>10</sup>.

However, this might change soon as Malaysia's economy is growing rapidly and the government is taking more progressive actions to improve their country's sustainability such as launching Green programmes like Penang2030 and strengthen their legal instruments.

Country	Hong Kong (2013)	Malaysia (2013)	Singapore (2017)
Population	7,187,500 people	29,716,965 people	5,612,000 people
GNP per capita USD	54,270	22,530	90,570
Waste generation	13,844 tonnes per day (2012)	33,000 tonnes per day (2012)	8,559 tonnes per day*
Agencies in-charge of environmental enforcement	Environmental Protection Department, Civil Engineering and Development Department	Ministry of Housing and Local Government, Ministry of Works, Ministry of Natural Resources and Environment and Construction Industry Development Board (CIDB)	Ministry of the Environment and Water Resources; National Environment Agency; National Climate Change Secretariat
Legal Act	Water Pollution Control Ordinance (1980), Noise Control Ordinance (1989), Waste Disposal Ordinance (WDO, 1980), Air Pollution Control Ordinance (1985) and Environmental Impact Assessment (EIA) Ordinance (1998)	Public Cleansing Management Act 2007 (Act 672), Environmental Quality Act 1974 (Act 127), Pembinaan Malaysia Act 1994 (Act 520)	Environmental Public Health Act (2002); Radiation Protection Act (2008); Transboundary Haze Pollution Act (2014); Prevention of the Sea Pollution Act (2014); Sewerage and Drainage Act (2001); Hazardous Waste Act (1998) **
Method of C&D treatment	Recycling, Reusing, Landfilling, Public filling area	Recycling, Incineration, Landfilling	Reduction, Recycling, Landfilling***

\* National Environment Agency's website  
 \*\* The Apcel Guide to Singapore and Asean Environmental Law, published by National University of Singapore  
 \*\*\* National Environment Agency, Environment Protection Division Annual Report 2016

C&D waste management and legalisation in Hong Kong, Malaysia and Singapore

Source: Wahi, Joseph, Tawie & Ikuu, 2016, with data of Singapore added by the author

As for Singapore, legislation is more comprehensive, covering not only the environment but also public health, sea pollution, transboundary haze pollution and even radiation risks. Similar to Hong Kong, incineration is banned. This is even earlier since 1999. Singapore is leading in sustainability practice because the focus is no longer on managing, but minimising the waste.

#### WASTE MINIMISATION

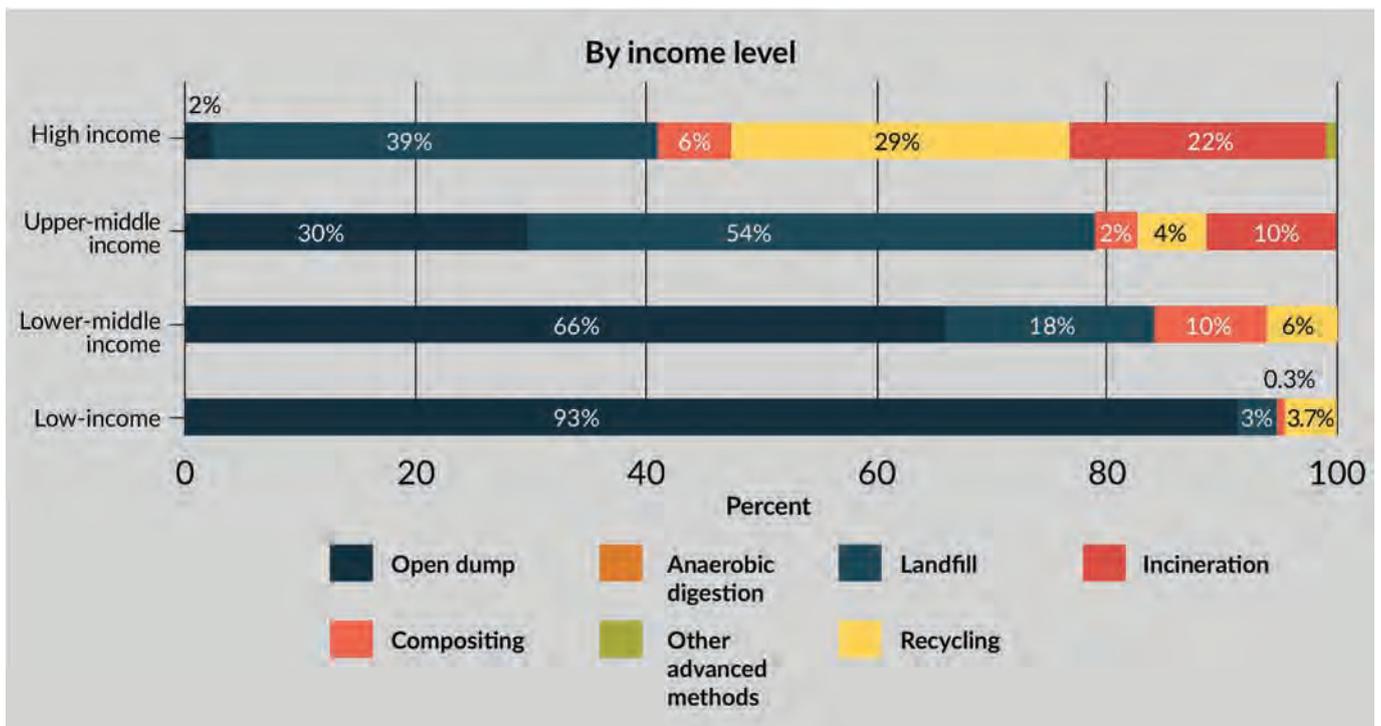
Waste minimisation, as defined by the UK Department of Environment, Food and Rural Affairs<sup>11</sup> means reducing waste by preventive measures, which means using less materials in design and manufacture; keeping products for

longer use; and using less hazardous materials. Similarly, construction waste minimisation is a systematic waste reduction at source, by avoiding and reducing waste before the physical generation, coupled with reuse, recycling and recovery.

#### How do sustainable materials help minimise construction waste?

Even in a high-income economy like Hong Kong, sustainability practices still centre around resource recovery. Optimality is still far from reach if waste management is not coupled with waste minimisation practices. And in construction, this means minimising virgin material extraction and utilisation.

## BALANCED WASTE MANAGEMENT HIERARCHY FOR DEVELOPING NATIONS IN ASIA



Waste treatment by income level

Source: What a Waste 2.0 by the World Bank Group

# SUSTAINABLE MATERIAL AND WASTE MANAGEMENT

By Biji-biji Initiative and Anisa Pinatih

Most people are constantly in need of more goods and services these days. Having just about everything a few taps away has made our consumption patterns become unhealthy. This also means more detrimental effects on the wellbeing of our planet. But ceasing to consume is impossible, so a more feasible solution is to reimagine consumption in a way that is beneficial to the people as well as to the planet.

## MATERIAL FLOW AND SUSTAINABILITY

The threat to the environment is not only from the exploitation of the non-renewable materials but also from the overuse of the renewable resources such as plastic, glass, cotton, wood, latex, charcoal and so on. The extraction, transportation and utilisation of these materials contribute to the increase of carbon emissions.

Advancement in technology and communication has allowed the world's economy to grow increasingly connected so more materials are being consumed and transported over longer distances. Data released by UN Environment Programme in 2013 shows that material consumption is painstakingly high in Asia Pacific, compared to any other part of the world; and this is predicted to remain high in the next decade. The report claims that Asia Pacific is the highest contributor of waste, at 23 per cent of the global disposal per 2019\*.

Substitution and recycling are not sufficient and will only delay ultimate depletion. Complete recycling of waste is almost impossible, especially for developing countries in Asia. Circular

economy framework is an ideal solution but this is difficult to put into practice. Effective resource management will reduce raw material extraction so waste and energy consumption will also be minimised.

Material flow and sustainability are interconnected. Understanding this is important to reduce material intensity. Generally speaking, the flow comprises the ecological system, industrial system and societal system. The ecological system is where energy is sourced and resources

are extracted. The industrial system is where supply chains take place and energy is produced. The societal system is where energy and products are used. These three systems are interconnected; the flow from the societal system to the ecological system is where waste is produced.

## SUSTAINABLE MATERIAL MANAGEMENT

Sustainable materials management focuses on material life cycles to achieve economic efficiency and environmental viability. The life cycles consist of material selection, exploration, extraction, transportation, processing, consumption, recycling, and disposal. Two ways to practise sustainability are through dematerialisation and detoxification.

Dematerialisation is a reduction along the life cycles by increasing efficiency in the supply chain; reducing packaging;



Seahorse installation from scrapped metal



The small-scale plastic recycling machine

designing eco-friendly products; cutting down transport; and recycling post-industrial and post-consumer waste. Meanwhile, detoxification is minimising the adverse impacts of materials' chemical waste by replacing hazardous materials; using cleaner technologies; reducing the toxic properties of waste streams; restricting the use of specified materials; and in-situ waste treatment.

While detoxification reduces the amount of dangerous material, dematerialisation minimises the use. Different industries implement these two approaches differently. Dematerialisation can also be accomplished by combining the use of raw and recycled materials.

### SUSTAINABLE WASTE MANAGEMENT

Waste must not be disposed to landfills without control, incinerated in the open, or ended up in waterways. Circular economy is increasingly being considered as a necessity, but this is still not forefront in practice. There should be well-linked approaches involving stakeholders at the national

and international levels, as well as plans for resource and waste management integrated into the economic system.

Environmental NGOs and CSOs should work hand-in-hand with policymakers to tackle the problems. A social enterprise based in Malaysia; Biji-biji Initiative supports the Green agenda by recycling materials from different resources. The recent installation, which has been displayed at a public space in Iskandar Puteri, Johor, utilises metal waste to create sculptures. The materials are mostly secondary, with 70 per cent being recovered from car parts collected from local workshops and 20 per cent from any scrapped metal. Only 10 per cent of the material is new. We disassemble the cars by hand so there is no use of machinery to minimise carbon footprint.

The increasing activities from industrial and societal systems have polluted soils with heavy metals across the globe—arsenic, lead, cobalt and mercury are among the many toxic metals. They can be reduced by detoxifying the

materials before utilising them to create installations. Biji-biji Initiative is also working on tackling plastic waste issues through the Beyond Bins campaign. Beyond Bins introduces small-scale recycling solutions while promoting an alternative source of income for the community through the production and selling of recycled products. The small-scale recycling machine, inspired by the open-source project Precious Plastic founded by Dave Hakkens, allows users to shred and mould the plastics into new products. The plastic is collected from consumer and manufacturing wastes. They are cleaned, sorted and shredded on-site before being repurposed for products such as house/office ornaments or stationary items.

Biji-biji Initiative contributes to waste management in Malaysia by recovering resources from ending in the landfills. This is one of the many approaches to tackle climate change issues. Resource recovery should also be accompanied by reducing consumption by the industry and society. The Malaysian government is now drafting more aggressive action plans to combat illegal waste disposal and to manage waste in general. By considering the material flow, it is hoped that the policies will also cover dematerialisation and detoxification programmes.

### ABOUT BIJI-BIJI INITIATIVE

Biji-biji Initiative is an impact-driven agency that aims to create a mindset change and behavioural shift towards sustainable living. We strive to inspire people into thinking and acting sustainably, collaboratively and constructively. Our journey began in 2013 when a group of four visionaries set out to change the sustainability scene in Malaysia through progressive ideas while changing the perceptions on how people see issues of waste and sustainability. The word Biji means seeds and at Biji-biji Initiative, our mission is to plant seeds for a better tomorrow. 🌱

*\*What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*



Reusable building materials

Aside from the application of Green design, the use of sustainable materials should become a priority. For example, bamboo is a good resource as it is abundant in Asia and highly sustainable. The FAO report in 2007 says that 65 per cent of the world's bamboo comes from Asia, with the majority being concentrated in China and the rest spread across Southeast Asia. Research<sup>12</sup> showed that the mechanical properties of engineered bamboo products are comparable with or even surpass those of timber or engineered timber products. However, construction on a large scale cannot rely solely on bamboo because procurement is still difficult and innovation is still lacking.

It is also important to note that C&D waste is not just about solids, but also in terms of carbon footprint. Bamboo may seem a viable option, but processing it needs substantial energy expenditure, resulting in more carbon emissions. Advancement in technology might eventually solve this limitation. Until then, we still need common materials

like cement, but this has to be combined with other elements to reduce virgin material extraction. Research by the Indian Institute of Science in 2009<sup>13</sup> proposes the following building materials and techniques.

**Blended cements:** Combining cement and complementary materials such as coal fly ash, granulated slag, silica fume and reactive rice-husk ash results in lesser CO<sub>2</sub> emissions. It was reported that substitution can go up to 40 per cent.

**Stabilised mud blocks:** These are made of compacted mixture of soil, sand and stabiliser. Major advantages include not involving burning, unlike the production of clay bricks; can be produced on-site and by using solid waste. The absence of burning alone should reduce energy by 70 per cent as opposed to the production of clay bricks.

**Compacted fly ash blocks:** These are a mixture of lime, dust, and fly ash being compacted into a high-density block. A

## Recycling and reuse should be coupled with reduction of virgin material extraction, which can be achieved by the use of advanced technology.

plus point of this method is that it uses phosphor-gypsum as additives, which is an industrial waste product.

**Rammed earth walls:** These solid walls are made by compacting processed soil in progressive layers. From an aesthetics point of view, the finished products offer a variety of textures and finishes. Thickness and strength can also be adjusted. Environmentally speaking, these walls production also requires low energy and utilises waste material.

Secondary materials should be used to minimise waste. The list above presents just a few examples of the many alternatives. What should be noted is that the substitution must not have higher energy consumption and carbon footprint than the use of virgin material.

### Building Information Modelling

The argument thus far is that recycling and reusing are not enough; and that there has to be a way to avoid waste generation. Another way to achieve this is by the use of technology that aids construction from early stage so that errors, miscalculations and the mishandling of materials can be prevented.

Building Information Modelling (BIM) may be the most promising solution as it is capable of generating and managing data that supports pre-construction phase, design phase, construction phase and post-construction phase. Because BIM can simulate construction before the actual physical construction, it can reduce uncertainty and minimise errors. In terms of waste minimisation, materials can be procured and delivered in a timely manner so that waste can be avoided.

BIM connects all parties, from owner and developer to the design and construction team. Easy access to and constant exchanges of information allow for early detection of errors. With real-time testing, reviewing and revising designs, as well as enhanced collaboration, construction will be more efficient, resources are reduced, and so are energy and waste products.

### BIM's critical success factors & challenges

A survey by National Building Specification in the UK in 2016 shows BIM adoption is the highest in developed countries: Denmark at 78 per cent, Canada 67, Britain 48, Japan 46 and Czech Republic 25. In Southeast Asia, the major players are Singapore and Hong Kong. Indonesia has implemented BIM too, but not effectively, with awareness among practitioners being high at 70 per cent, but implementation in the industry was as low as 38 per cent (reported in 2016 by Indonesian

Environment Researcher Association<sup>14</sup>).

In Singapore, firms such as Arup Singapore and WSP have adopted BIM successfully. In Hong Kong, Aedas Limited and LWK & Partners are some of the firms that use BIM in their project design and drawing production. According to research by National University of Singapore in 2017<sup>15</sup>, the critical success factors of BIM implementation in Singapore include accuracy of models, training from the management, as well as advantages and support of implementation.

Meanwhile, in a country where BIM adoption is more recent such as Indonesia, there are still many challenges. The latest research by Universitas Diponegoro in 2019<sup>16</sup> identifies some of the factors that hinder the nation to successfully implement BIM. First, it is the reluctance to adopt new system, especially from Indonesian bureaucrats, because BIM is deemed to be complex and difficult to implement. Then, competence is low in the industry, which leads to poor operations. Finally, many companies claim that they cannot bear the costs because BIM adoption requires software installation and maintenance, staff training, and overall changes in their operational systems.



Combining the use of bricks and stabilised mud blocks to reduce energy consumption



Housing made from recycled container in Serdang, Malaysia

### Recommendations

From the examples above, it can be concluded that the adoption of technology to minimise construction waste also depends on financing, just like how waste treatment is determined by how much budget is available. Aid from international organisations might help developing nations practise sustainability, but the ultimate solution is for the nations themselves to increase the income level and the economy in general.

Governments play a crucial role in the policy making. For example, Singapore requires projects larger than 5,000 square metres to register their BIM e-submissions<sup>17</sup>. The Hong Kong SAR government supports waste management practices with legal instruments that the construction industry must adhere to.

As for the lack of expertise, education and training are needed to increase the competence of industry players. University graduates should also be equipped with sufficient knowledge about sustainability by making it an integral part of the curriculum.

All in all, C&D waste management and minimisation is not just the responsibility of architects, engineers and constructors, but also the governments and the society at large. It is more than an environmental

issue because of how deeply connected the issue is with other sectors, so tackling it requires intensive collaboration. 

<sup>1</sup>World Development Report 2012, The World Bank

<sup>2</sup>What a Waste 2.0: A Global Snapshot of Waste Management to 2050, World Bank Group

<sup>3</sup>Global Status Report 2017: towards zero-emission, efficient, resilient building and construction sectors

<sup>4</sup>Released by Economic Drivers and Environmental Consequences (OECD)

<sup>5</sup>The Straight Times, 2019

<sup>6</sup>Source: International Solid Waste Association (as prepared by Environmental Management LLP)

<sup>7</sup>What a Waste 2.0 - Global Snapshot of Solid Waste Management to 2050 by the World Bank

<sup>8</sup>The World Bank Press Release NO: 2018/037/SURR

<sup>9</sup>Wahi, N., Joseph, C., Tawie, R. and Ikau, R. (2016).

Critical Review on Construction Waste Control Practices: Legislative and Waste Management Perspective. *Procedia - Social and Behavioral Sciences*, 224, pp.276-283.

<sup>10</sup>Moh, Ying Chiee and Abd Manaf, Latifah (2014)

Overview of household solid waste recycling policy status and challenges in Malaysia. *Resources, Conservation and Recycling*, 82. pp. 50-61. ISSN 0921-3449; EISSN: 1879-0658

<sup>11</sup>Guidance on Applying the Waste Hierarchy, 2011

<sup>12</sup>Sharma, B., Gatão, A., Bock, M. and Ramage, M. (2015). Engineered bamboo for structural applications. *Construction and Building Materials*, 81, pp.66-73.

<sup>13</sup>Venkatarama Reddy, B. (2009). Sustainable materials for low carbon buildings. *International Journal of Low-Carbon Technologies*, 4(3), pp.175-181.

<sup>14</sup>Conference Proceeding of Temu Ilmiah IPLBI 2016

<sup>15</sup>Liao, L. and Teo, E. (2017). Critical Success Factors for Enhancing the Building Information Modelling implementation in Building Projects in Singapore. *Journal of Civil Engineering and Management*, 23(8), pp.1029-1044

<sup>16</sup>Hatmoko, J., Fundra, Y., Wibowo, M. and Zhabrinna (2019). Investigating Building Information Modelling (BIM) Adoption in Indonesia Construction Industry. *MATEC Web of Conferences*, 258, p.02006

<sup>17</sup>Singapore BIM Guide version 2 published by Building and Construction Authority 2013



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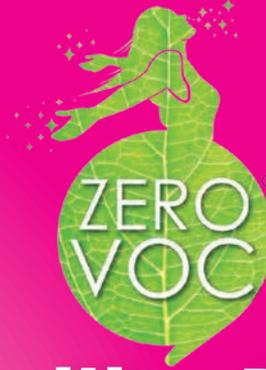
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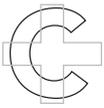
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## SURBANA JURONG IS FIRST IN SINGAPORE TO ATTAIN NEW INTERNATIONAL BUILDING STANDARD

23 January 2020

Surbana Jurong, one of the largest infrastructure and urban design consultancies based in Asia, has become the first company in Singapore to be awarded the new ISO 19650 accreditation for the digitisation of design and engineering data for buildings and civil engineering works, including building information modelling (BIM). Surbana Jurong is also the first consultancy in Asia to attain the new certification.

The accreditation, approved by the International Standards Organisation (ISO), demonstrates the group's compliance with the highest BIM modelling standards in projects. Surbana Jurong Group Chief Executive Officer Wong Heang Fine said: "Greater adoption of BIM will rapidly transform the built environment industry in the coming years. BIM creates value from the combined efforts of people, process and technology. For Surbana Jurong, BIM has become a way of work. It enables our teams to make informed decisions at every stage of a project and work collaboratively and seamlessly to drive the best outcomes for our clients."

ISO 19650 accreditation provides an assurance to clients that Surbana Jurong is able to provide effective and compliant BIM services of the highest standards to clients in every part of the world. Lloyd's

Register, an ISO accrediting body, is supporting a number of government bodies, architecture firms and other building consultants in Asia in their efforts to attain the certification.

Mr Fotis Kampouris, Business Director, Lloyd's Register said: "Surbana Jurong is one of the world's leading urban design consultancies and has always been ahead of the curve in its use of technology, so it comes as no surprise that it is the first organisation in Singapore to be awarded ISO 19650 certification."

## KLAF2020 TO PROMOTE APPRECIATION FOR ARCHITECTURE

15-16 February 2020

Pertubuhan Akitek Malaysia (PAM), the professional body for Malaysian architects, has launched Kuala Lumpur Architecture Festival (KLAF) 2020 at PAM Centre, Kuala Lumpur. The launch on 15 February 2020 was officiated by the Minister of Housing and Local Government, YB Puan Hajjah Zuraida Binti Kamaruddin.

Open to the public, the annual festival is the premier event in Malaysia's architectural calendar and will stage various programs until August 2020. KLAF2020 involves the architectural fraternity, designers, artists, academia and students as well as members of the public, coming together to celebrate architecture, art and design.

PAM President Ar. Lillian Tay said KLAF is organised annually to promote appreciation for architecture among the public. "It is an opportunity for architects from all over Malaysia and overseas to meet and share their ideas and aspirations. This year's theme Beyond aims to inspire the architectural fraternity and the public alike with ideas that are beyond the ordinary," she added.

The Minister of Housing and Local

Government, YB Puan Hajjah Zuraida Binti Kamaruddin said KLAF has made an impact in improving the well-being of the community as well as the quality of future residential developments.

"I'm happy to see ideas and efforts being put forward in the development of green buildings and homes. A sustainable approach to construction is important in preserving the environment, but what's equally important are sustainable and wellness technologies in public housing as these will enhance the residents' quality of life," she said.

KLAF2020 Director Ar. Dr Tan Loke Mun said: "Over the years, we've successfully drawn more than 35,000 participants to the various Festival events, and hope to continue expanding our reach to the community and increase public participation each year."

PAM also collaborated with EPIC Homes to launch an international design competition to increase its design bank and, in turn, empower marginalised communities such as the B40 *orang asli* communities with the power of choice on housing suitable for their needs.



MOU signing between Epic Home and PAM



Left to right: Ar Dr Tan Loke Mun, YB Senator Liew and PAM President Ar Lillian Tay



The awardees

## SHASSIC DAY AWARDS 40 MALAYSIAN CONTRACTORS IN SAFETY AND HEALTH

25 February 2020

Construction Industry Development Board (CIDB) Malaysia has recognised 40 contractors for achieving 5-star rating of Safety and Health Assessment System in Construction (SHASSIC) on SHASSIC Day, which was held for the first time in Malaysia on 25 February 2020.

SHASSIC Day was organised to recognise industry players' high performance in construction safety and health practices. This programme is in line with the goals outlined in the core Strategic Quality, Safety and Professionalism under the Construction Industry Transformation Program (CITP) 2016-2020, that is to reduce the number of accidents and deaths at construction sites by 10 per cent.

"The death rate in the Malaysian construction industry is 13.44 deaths per 100,000 construction workers, the highest compared to other industries in the country. Efforts to change these statistics cannot rely on one party or agency. In fact, authorities, clients or project owners, consultants, employers

and employees themselves play their part in ensuring the safety at the construction site," said Dato Ir. Dr. Meor Abdul Aziz Bin Osman, Chairman of CIDB Malaysia.

SHASSIC was introduced in 2008 through the cooperation of CIDB with other agencies such as the Department of Occupational Safety and Health (DOSH); Public Works Department (JKR); and Master Builders Association Malaysia (MBAM). SHASSIC is considered as an objective evaluation system that can be benchmarked against standard systems in the Malaysian construction industry.

"Based on the SHASSIC score, industry players can identify the level of health and safety. To help industry players improve health and safety practices, special training or corrective action can be arranged to assist contractors and their employees to improve safety and health management at the site. Through this effort, it is hoped that accident cases in construction can be reduced and the quality and well-being of people working in the industry can be improved," said Dato' Ir Ahmad 'Asri Abdul Hamid, Chief Executive of CIDB Malaysia.

## UPCOMING EVENTS

### HOMEDEC KUALA LUMPUR

Home design and interior exhibition  
16 - 19 Apr 2020  
10:00 AM - 08:00 PM  
Kuala Lumpur Convention Centre  
[www.homedec.com.my](http://www.homedec.com.my)

### MALAYSIA PROPERTY EXPO

International real estate investment  
exhibition  
17 - 19 Apr 2020  
10:00 AM - 09:00 PM  
Mid Valley Exhibition Centre  
Mid Valley Megamall  
[www.mapex.com.my](http://www.mapex.com.my)

### WORLD CONGRESS ON INFRASTRUCTURE ASSET MANAGEMENT

International conference  
20 - 21 Apr 2020  
09:00 AM - 06:00 PM  
Hotel Bangi-Putrajaya  
[www.infraassets.com](http://www.infraassets.com)

### 121 PROPERTY INVESTMENT SINGAPORE

Conference and workshop  
11 - 12 May 2020  
09:00 AM-06:00 PM  
Pan Pacific Singapore  
[www.weare121.com](http://www.weare121.com)



# Sarawak Museum: Heritage inspires contemporary design

Here's how this golden masterpiece transforms environmental cues into vibrant architecture with **COLORBOND®** steel.

Sarawak Museum has long been a landmark in Kuching. In 2020, its facelift will take the town by storm. A new exhibitory and annexe building will take up an additional 31,000 square metres of its Padang Merdeka site.

Deriving inspiration from the golden dome and towering arches of the Sarawak State Legislative Assembly across the river, Sarawak Museum was designed to complement the existing architectural language of Dewan Undangan Negeri Building.

## A taste of tradition

Tasked with a design brief that requires the marriage of both the old and new while featuring the abstract reinterpretation of weavings in Sarawak, project team of Arkitek KDI consciously designed the soon to be largest museum in the country and second largest in Southeast Asia.

The façade is designed for architectural dialogue that resulted in the perimeter arches that crowned the colonnades on the museum's exterior, which resonates with the arch-ornamented DUN building.

Comprising five storeys in its main building and three storeys in the annex with a basement storage, the new Sarawak Museum is bathed in materials and design resonating its homeland. For example, the four-level atrium is given staggered platforms, dressed in natural colour tones and textures that evoke the lush natural environment of Sarawak.

According to the project team of Arkitek KDI, "The diamond-shaped cladding is inspired by a common motif we found in Sarawak songket, pua kumbu (Iban handwoven textile) and basketry work by Orang Ulu. We arranged it in such a way that it formed the external facade using modern materials."



**COLORBOND®** by NS BlueScope Malaysia  
**LYSAGHT® 360 SEAM®** Profile by  
NS BlueScope Lysaght (Sarawak) Sdn Bhd  
Architect: Arkitek KDI



## Overcome challenges

The Sarawak Museum, which will be the largest in Malaysia, including on Borneo stands at 42.9 metres in height. This is especially for the main building. It posed a challenge for the team as the fabrication and installation processes were complicated due to the height of the building. Despite the challenge, the Supply and Install team managed to successfully complete the installation task with sound craftsmanship.

## A modern solution

**“Chief among these materials is COLORBOND® steel, a material that has various applications in the building industry.”**

Durable, versatile, and attractive with an understated gloss, COLORBOND® XPD PEARLESCENT steel Pearl Gold by NS BlueScope Malaysia is used to bring out the stunning qualities of the building design that require maintaining of premium colour durability.

Sarawak’s humid tropical climate calls for the use of corrosion-resistant materials that will not be dulled by rain or shine. COLORBOND® XPD PEARLESCENT steel formulated with PVDF resin in its paint system has the finest paint durability, excellent weather-ability and high formability for exterior roofing and walling applications. The highly durable PVDF paint system with excellent corrosion and dirt staining resistance helps the roof look good and retains its gloss while remaining clean longer. The colour Pearl Gold was used as it offers the most promising and optimal colour, long term colour, shine and lustre. The COLORBOND® XPD PEARLESCENT steel Pearl Gold radiates a striking effect while exuding a style like no other.

In an effort to meet the roofing requirement for long and complex shapes, LYSAGHT® KLIP LOK® OPTIMA™ was used. This was complemented with LYSAGHT® 360 SEAM® profile that suits a variety of roofs from pitched to

curved and tapered designs. These roof profiles produced by NS BlueScope Lysaght (Sarawak) Sdn Bhd is the ultimate roof profile that accentuates style, versatility and performance. Hence, making it a perfect fit for the Sarawak Museum project.

## Lasting legacy

The usage of COLORBOND® steel is a wise decision as it offers the assurance of long lasting, durable, tough, aesthetically pleasing and energy efficient solution. It allows for the bold visual expression through the choice of the colour and the proven attributes, which leads to it being a lasting legacy.

Since the museum is expecting a Green Building Index certification, each component must be sustainable; COLORBOND® steel fits the bill as its steel is infinitely recyclable.

Knowing that it is built to last gives the reassurance and peace of mind that this is a monumental structure that will continue to retain its richness of its natural, cultural and historical heritage.

The rich architectural design will further enhance the museum’s position as the global world-class institution. The iconic gold roof will fast become Sarawak Museum’s identifying factor.

For more information, visit <http://www.bluescope.com.my> or email us at [enquiries.malaysia@bluescope.com](mailto:enquiries.malaysia@bluescope.com) or call BlueScope at 1 300 88 6288





## JOSEPHINE TAN

**Josephine Tan is General Manager of the Penang Green Council. She has also served as a Special Officer in charge of environmental portfolio under the Penang State Government. Her track record in environmental activism also comes from her involvement in various NGOs such as United Nation Environmental Programme, International Solid Waste Association, and UN Habitat. She believes that achieving sustainability is only possible through an integrated approach involving policy makers, industry players, national/international networking platforms and society at large.**

### **What started you into this journey to care about the environment?**

It started many years ago when the first tsunami hit Penang in 2004. It was believed to be the deadliest tsunami in history, killing more than 230,000 people across 14 countries, including Malaysia. Triggered by a 9.3-magnitude undersea earthquake off the west coast of Sumatra, Indonesia, the tsunami claimed 52 casualties from Penang itself, leaving us reeling. Malaysia has never been hit by natural disasters like earthquakes and volcanic eruptions because our location is not on the Ring of Fire. However, we should still be wary since Malaysia could potentially suffer from the compression energy formed by the neighbouring

countries that stand on the Ring of Fire. My question was how that could happen.

It is getting warmer day by day because greenhouse gas emissions have increased the greenhouse effect and caused Earth's surface temperature to rise. Warmer temperatures lead to a chain reaction of other changes. It affects the oceans, weather patterns and ecology. We realised that climate change has directly affected us and it is not going to stop if we do not take action to address its destructive behaviour. During that massive tragedy, many people were vulnerable and did not know what was happening and what to do, including myself. I was still very young at that time. Over the years, I have

gained exposure and experience, and I realised that the challenges our state is facing today is a lack of knowledge about climate change. It is a worldwide issue and no one is immune to it. Penang is already feeling the impact—massive flash floods hit us every year even though we have mitigation plans being laid out.

Seeing all these changes first-hand, I have decided to make climate change a top priority issue that we need to look into and address.

### **What are the biggest problems facing our environment?**

Throughout the nine-year journey in creating awareness and educating the



PGC programmes aim to help young generation understand issues related to climate change

## Some people choose to be climate silent, which means that they are aware of the situation but choose not to take any actions.

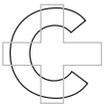
community, I have discovered that some people choose to be climate silent. Most people are aware and understand that the Earth is threatened, but they choose not to do anything. The sense of ownership to take part and protect the planet is still low. In Penang, flash floods, eroded shorelines and illegal dumping of plastic wastes from other countries are some of our biggest problems.

When China decided to ban plastic waste in their country, the overflowing trash from developed countries were directed to other countries, and among them was Malaysia—to cities like Penang, Kedah, Selangor and Sarawak. Illegal recyclers sort out high-grade plastics from the smuggled waste—they fetch a good price. Meanwhile, cheap materials such as plastic bags were burned or illegally dumped in many parts of the country.

### How does Penang tackle such problems?

Penang has always been taking a step forward in addressing climate change and its impact. In the last 10 years, Penang has already started promoting Green initiatives policies and campaigns such as No Free Plastic Bag Every Day; Waste Segregation at Source Policy; and No Single Use Plastic. Now, the state is already looking into energy efficiency and renewable energy too.

In 2011, the Penang state government set up the Penang Green Council (PGC) with a vision to create a central hub that harnesses Green technology and supports holistic Green initiatives to achieve a sustainable and resilient Penang. In order to achieve this, we must enable, empower and enrich all stakeholders to practice sustainable development that protects the environment and quality of



Josephine Tan presenting Green Pinang Award 2019

**To tackle climate issues, industry players must work hand-in-hand with other stakeholders. No man is an island; each of us has a role to play in ensuring that we do not pass down a world beyond repair to our children.**

life. Seven years later, the Chief Minister of Penang, YAB Chow Kon Yeow launched Penang2030, which serves as an action plan to increase liveability, upgrade the economy, empower people, and invest in the built environment (please see Foreword in this issue). There are four main themes in this action plan; and PGC is tasked to focus on sustainability issues.

**What do you think are the challenges facing Malaysia's construction industry to create for a more resilient and liveable, nature-friendly built environment?**

I think the most challenging part in today's construction industry would be the costing that developers have to bear sustainable options. There are developers who are not very keen to opt for sustainable

alternatives as some of them do rely on seasonal fluctuations and unpredictable weather conditions. Many do not prioritise environmental benefits. This is understandable as businesses mostly aim to make profits. Due to the high cost, many industrial players had to sit out for now, but I am hopeful that one day, the Malaysian market could provide viable options. I believe we have the capacity and capability with a strong will to work towards it. It might take on a rough start but persistency does bring about results.

**How do you think the construction industry could contribute to a more environmentally conscious and less wasteful way to design spaces, in light of the current climate situation?**



When we mention Green building, Green technology would definitely be in the picture. With a combination of active and passive designs, Green technology will help reduce the operational costs in the future. Recyclable materials can help minimise carbon emissions, reduce operational costs and increase productivity. Besides that, the construction process is also something to be looked into. Developers should be looking into maximising the use of raw materials and the waste that comes out of the site. One man's trash could be another man's treasure. By considering this, many could also reduce disposal costs and wastage of raw materials on-site.

**How do you think construction practitioners could collaborate more cohesively with other industry players to bring about greater integration, especially in such a diverse cultural, socio-political setting such as Malaysia?**

Outlined by the Ministry of Energy, Science, Technology, Environment and Climate Change, the national target for renewable energy is 20 per cent by 2025. For Penang itself, under the Penang2030

vision, the government is targeting all new developments to get GBI Gold certification from 2020 onwards. In addition, the Penang local council also requires that all new development projects have to install Rainwater Harvesting and Utilisation system. This has been gazetted under Uniform Building (Amendment) By-Laws 2016. This year, the state is going to set up a task force on energy efficiency and renewable energy to increase the uptake of renewable energy projects in Penang by 2025. This is done through the introduction of an effective framework that involves many relevant stakeholders.

**What is our duty as custodians of the environment?**

No man is an island; each of us has a role to play in ensuring that we do not pass down a world beyond repair to our children. The responsibility to take care of the environment should be put on everyone's shoulders. If we look from the context of the environment, climate change can impact a lot of aspects, such as food supplies, home, clean water and source of energy.

For PGC, we play our role as a hub or point of reference for novel ideas to tackle environmental issues in Penang. We also focus more on research, policy and academic work in the areas of development, climate change, resilience and balanced development. Last but not least, PGC also develops tools, ideas and opportunities to harness Green technology and improve the engagement of people in environmental actions.

**How does PGC raise awareness of sustainable living?**

Since PGC was established, we have introduced a lot of programmes for different age groups so that everyone can participate. As we believe that environmental education should start from young, we have several programmes that facilitate young children and teens through our Penang Green School Awards, Penang Green Kindy Incentive and environmental camps. In the Green Map programme, we conduct eco-tours

for the public to visit local facilities like the water treatment plant. This is to help the general public better understand the life cycle of water.

The state government also recognises individual and organisational efforts by rewarding them incentives and awards every year with categories like Penang Green Office Certification; Penang Green Journalism; Penang Environmental Sustainability Awards; and so on. PGC also organises major events like the Penang Green Carnival—a family day where people from all walks of life come together and share their knowledge about the environment.

**How does PGC collaborate with other sectors and industry players to bring about greater impact?**

PGC has set up a Zero Waste Network—a database search tool that allows people to search for the nearest recycling and/or buy-back centre locations and contacts in Penang. It aims to shorten travelling time and reduce carbon footprint, increase efficiency of recycling and repurpose waste to achieve a zero-waste economy. We have a close connection with private sectors like recyclers and buyers. We help conduct stakeholder consultations and dialogues to receive public feedback before any policy or new campaign is formulated by the state government. We also maintain our partnerships by engaging with schools, institutions and universities.

This year, we have started a new project called Sustainable Neighbourhood Development Programme. We will work together with Majlis Pengurusan Komuniti Kampung, joint management bodies and local community leaders to implement a long-term community change for waste management by empowering them to lead the community through training and guidance from PGC. We also have Training of Trainers—a two-day workshop for environmental educators. This workshop is facilitated by certified trainers from PGC and guest trainers with relevant expertise. 📍

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# BAMBOO VEIL HOUSE

The Bamboo Veil House sits on a street corner on a triangular plot with a narrow frontage. The building had not undergone significant renovation after it was constructed, so it was considered out-of-date. The owner decided to transform it into a modern, minimalist house with a large social space that would serve as a welcoming respite amidst Singapore's dense urban environment and tropical climate.

Spatial arrangement of the odd-shaped plot was not difficult because the owner only required three bedrooms. The ground floor was allocated for dining and entertainment; the second floor for bedrooms; and the attic for a study and a family room. The façade was inspired by a Nezu Museum by Kengo Kuma in Tokyo that the house owner saw during a family vacation. The focal point of the renovation, therefore, was a bamboo veil akin to the museum's façade.

## THE BAMBOO VEIL

The veil was made of bamboo poles that were lined up vertically and sandwiched between defined white eaves. Purposed for both form and function, this bamboo screen wraps around the building in a single unifying element and flows around the rounded edges of the façade, creating a soft and dynamic layer. The bamboo's natural colour stands out against the white backdrop. The veil is visually attractive as well as functional because it was designed to enhance the privacy of the occupants.

When night falls, light from the inside perforates the bamboo poles, creating a play of light and silhouette, making the house look like a lantern from the outside. Inside, the closed screen creates a sense of intimacy. In the daytime, when closed, the screen functions as a shading element that reduces the amount of sunlight flowing into the rooms; and when opened, it allows for natural daylighting and views.



The bamboo veil wrapping around the building





Social space on the ground floor for family and friends to gather

### ADAPTING TO THE TROPICAL CLIMATE

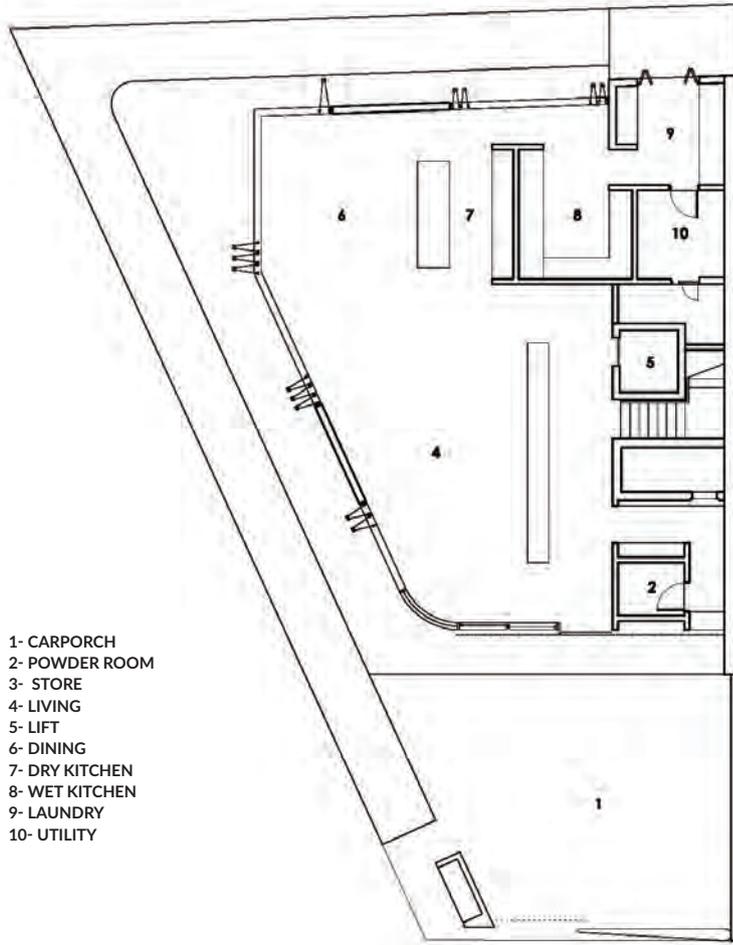
To adapt to the tropical setting, the façade is designed as a double skin. The outer skin is the bamboo veil and the inner skin is made of aluminium-framed glass windows. Just like the veil, the windows can be opened for natural air circulation when the weather is cool, or closed for air-conditioning when it is hot and humid. Together, the skin combo provides natural air circulation and lighting without compromising privacy. The tropical design is also reflected in the first storey and the attic by the large overhang that provides shading to keep the house cool.

### SUSTAINABLE AND ENERGY SAVING

The locally-sourced bamboo is light and strong; easy to install; replace or repair; and has low carbon footprint. Not only is it renewable, but it is also fast-growing, producing more material than regular wood. The owner decided to use this material for the veil to help cool the house passively and to reduce reliance on the energy intensive air-conditioning. The flexible bamboo screens and windows not only encourage natural air circulation, but they also to help reduce the house temperature as insulation. 



Dining area on the ground floor



- 1- CARPORCH
- 2- POWDER ROOM
- 3- STORE
- 4- LIVING
- 5- LIFT
- 6- DINING
- 7- DRY KITCHEN
- 8- WET KITCHEN
- 9- LAUNDRY
- 10- UTILITY

The first storey plan

**PROJECT DATA**

**Project Name**  
Bamboo Veil House

**Location**  
Bukit Timah, Singapore

**Completion Date**  
2019

**Site Area**  
385 square metres

**Building Height**  
2 storeys; 1 attic

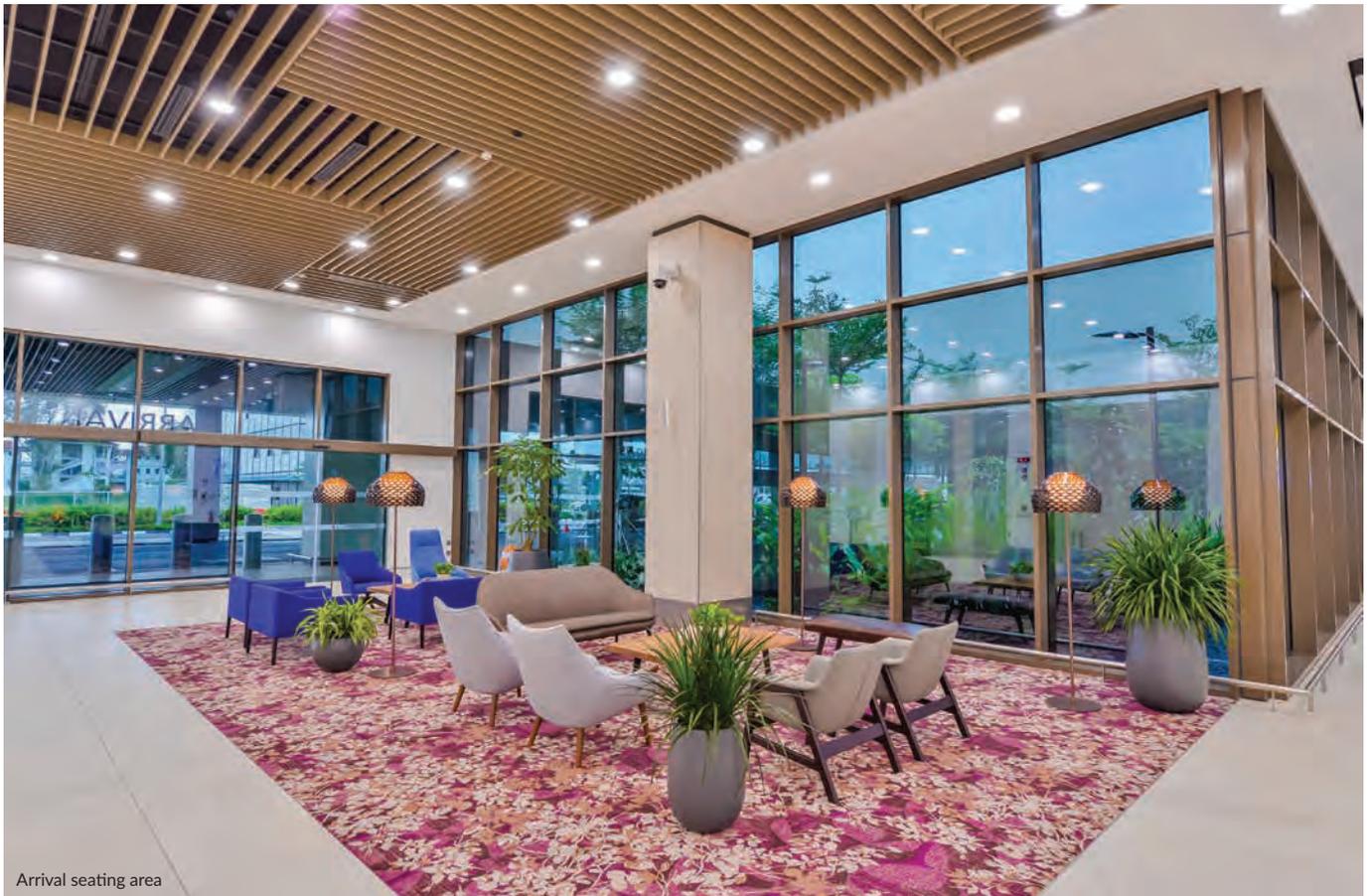
**Architecture Firm**  
Wallflower Architecture + Design

**Principal Architects**  
Robin Tan; Sean Zheng;  
Yong Mien Hwei; Tan Yen Lin;  
and Elvan Ong

**Images**  
Marc Tey Photography



The double skin consisting of bamboo veil and glass windows



# SELETAR AIRPORT

The Seletar Passenger Terminal Building features a partial two-storey building with adjacent departure and arrival halls, a central courtyard and a dedicated business aviation centre. Spanning a gross floor area of 10,000 square metres, the terminal is planned with a handling capacity of 0.7 million passengers per annum.

The passenger terminal features three new aircraft stands situated in front of the terminal building to provide passengers quick and efficient aircraft access. The apron is designed to accommodate aircraft types of up to ATR72 size. Larger flights, if needed, can be facilitated by bussing passengers to/from remote aircraft stands.

## TROPICAL DESIGN

Drawing inspiration from its lush and serene surroundings of the Seletar area in the north of Singapore, the terminal sports a modern tropical look on the façade and in the interiors. The design blends warm woody tones with the natural surroundings,

with a landscaped garden in the middle of the terminal. The arrival and departure halls have been designed to offer comfort and respite. Facing the central courtyard, the halls and lounge area carry forward the greenery effect with potted plants.

## MODERN AMENITIES

The terminal is designed with advanced security screening facilities similar to those at Changi Airport. The preboard immigration counters are placed on a linear and intuitive route through the departure hall, allowing for a quick and stress-free screening process.

For passengers travelling on private jets and chartered business jets, there is a private drop-off area leading to an exclusive Business Aviation Centre, which offers an efficient yet luxurious gateway for business aviation and their passengers. It features amenities such as a lounge area, a dedicated immigration counter, an advanced security screening system and other personalised services. 



Lounge at the Aviation Business Centre



Departure immigration



Greenery surrounding the airport

**PROJECT DATA**

- Project Name**  
Seletar Airport
- Location**  
21 Seletar Aerospace Road 1,  
Singapore
- Completion Date**  
April 2018
- Site Area**  
25,000 square metres
- Gross Floor Area**  
10,000 square metres
- Building Height**  
2 storeys
- Owner**  
Civil Aviation Authority of  
Singapore (CAAS)
- Operator**  
Changi Airport Group  
(Singapore) Pte Ltd
- Architecture Firm**  
3HPArchitects Pte Ltd
- Principal Architect**  
Chng Beng Guan
- Civil & Structural Engineer**  
Surbana Jurong Consultants  
Private Limited
- MEP Engineer**  
GIMS & Associates Pte Ltd
- Quantity Surveyor**  
Surbana Jurong Consultants  
Private Limited
- Main Contractor**  
Takenaka Singapore Pte Ltd
- Interior Fit-Out Contractor**  
Tat Wai Enterprise Pte Ltd
- Images**  
Changi Airport Group  
(Singapore) Pte Ltd

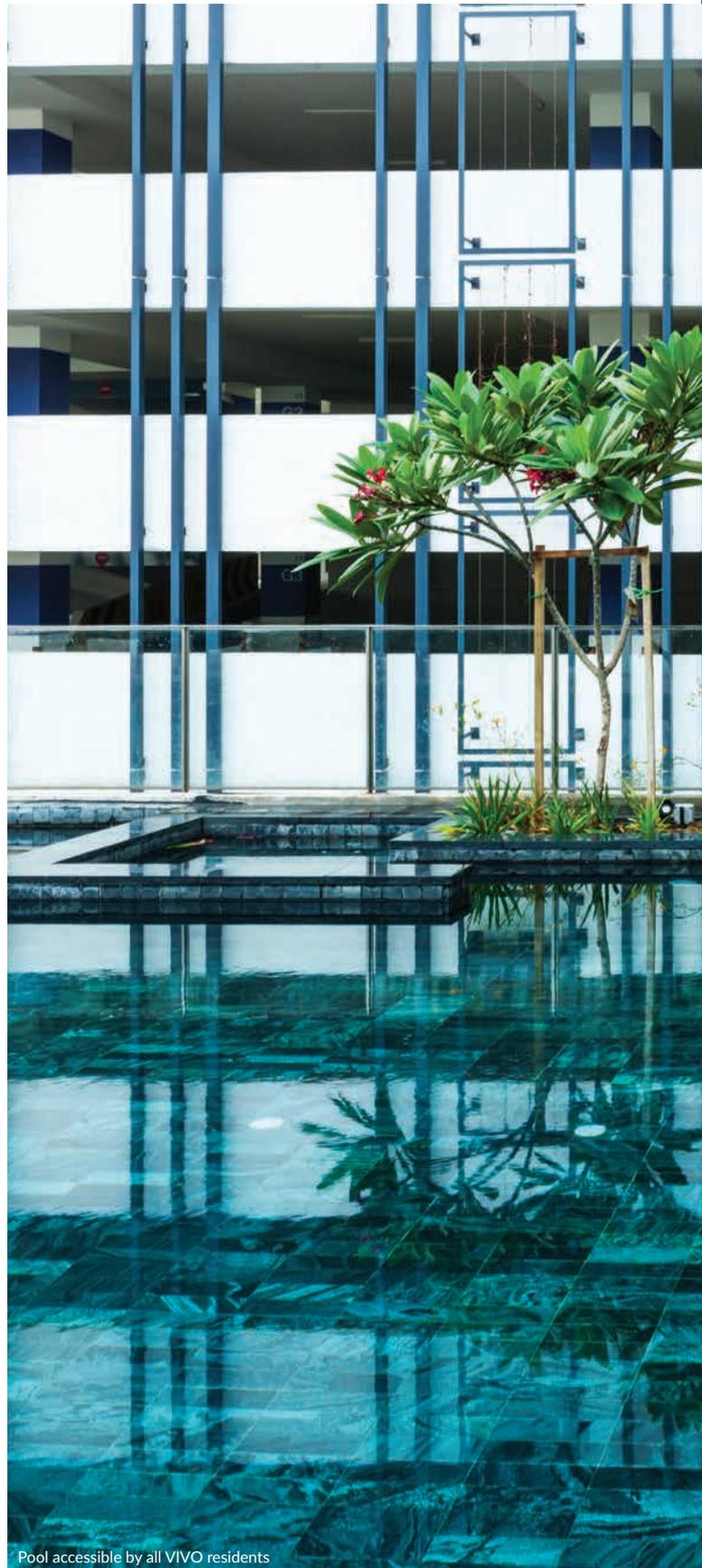
# VIVO RESIDENCE

Set against the urban background comprising high-rises such as Mid Valley and Bangsar, as well as KL Sentral, the design concept of this project draws inspiration from the courtyard gardens of Alhambra in Spain, where residences are indulged with relaxing open plazas, landscaped riverbanks and greenery amidst a busy downtown.

It is also about experiencing modern living in a self-contained context. The complex, therefore, has a large central garden surrounded by one-stop commercial lots that cater to the residents' daily needs. Various facilities are distributed across the floors and towers as well. Privacy and safety are maintained by creating separate drop-offs and facilities for the residential areas and the commercial areas.

## TRANSFORMING THE OLD NEIGHBOURHOOD

Old Klang is one of the oldest and most historic areas in Kuala Lumpur. VIVO Residence transforms the old neighbourhood into a modern urban setting by upgrading the infrastructure and amenities, as well as the recreational facilities in the surrounding areas. The suites are accessible via Old Klang Road with connectivity to Federal Highway and New Pantai Expressway that provide regular buses and taxi services. Klang River nearby is also improved by laying out landscaped parks along its bank.



Pool accessible by all VIVO residents





The view from Old Klang Road overlooking the NPE link bridge

The blocks stand tall from afar, but the site is not adjacent to the main road. To overcome this, a dedicated link bridge to New Pantai Expressway was built, as well as a covered link bridge to an upcoming monorail station.

#### OPTIMISING SUSTAINABILITY

VIVO Residence is a regeneration exercise of an old dilapidated part of the city. The one-stop living space also means reducing the use of motorised transport. Moreover, the residential project, as part of 9 Seputeh, is a Green Building Initiative-certified development, which means that certain percentage of the construction waste was diverted to be recycled on-site and off-site. The bulk of the materials were locally sourced to reduce cost and energy consumption during transportation, although some of the finishes are imported due to pricing competitiveness. 



Jacuzzi facilities distributed across floors and towers



Sculptural landscape features installed at the open amphitheatre

## PROJECT DATA

### Project Name

VIVO Residence 9 Seputeh Development

### Location

Old Klang Road, Kuala Lumpur, Malaysia

### Completion Date

March 2019

### Site Area

32,212.73 square metres

### Gross Floor Area

165,678.67 square metres

### Building Height

42 storeys; 101 metres

### Number of Units

824 apartments; 287 SOHOs

### Client

MRCB Seputeh Land Sdn Bhd

### Architecture Firm

VERITAS Architects Sdn Bhd

### Principal Architect

Ar. Azril Amir Jaafar

### Interior Design Firm

DesignTone Sdn Bhd

### Principal Designer

Chan Wan Hoe

### Civil & Structural Engineer

Jurutera Perunding Meinhardt Sdn Bhd

### Mechanical & Electrical

#### Engineer

Associated Group Konsult Sdn Bhd

### Quantity Surveyor

JUBM Sdn Bhd

### Landscape Architect

VERITAS Landscape Sdn Bhd

### Green Building Consultant

Bureau Veritas (M) Sdn Bhd

### Main Contractor

MRCB Builder Sdn Bhd

### Interior Fit-Out Contractor

Modular Scale Sdn Bhd

### Images

VERITAS Architects Sdn Bhd



## ZEN HOUSE

The house was built upon an existing structure, where the designers sought to transform the redundant space into appealing living areas. Designed to meet the needs of the dwellers, the house is not just another project, but also a space with customised elements that fit right into the occupants' daily lives.

The house is laid low in front to link with the street level, with its rear sitting on the slope with a gradual cascading landscape to blur the level differences. The house is further connected with the environment where the panoramic views to the low-rise houses and forest reserve is unobstructed.

The split-level effect of the bungalow was reduced by taking down 50 per cent of the building structure to provide higher headroom. The confined interior spaces were then lifted up and well-lit from the enhanced natural lighting and cross ventilation. Walls that separated the garden from the interiors were also taken down and replaced by floor-to-ceiling

windows. Additionally, a semi-indoor green pocket space was created. This is a courtyard where the home owners can enjoy open air and greenery without compromising privacy.

The courtyard is not only a gem that holds the house together and but it also provides a safe haven for the home dwellers, an open space that protects the interior from the external elements.

Direct sunlight that enters the spaces from the courtyard is minimal, keeping the rooms cool and usable. Even in the hottest afternoons, or during a heavy storm, the door and windows surrounding the courtyard can be kept open to provide natural ventilation to the adjacent rooms.

Design features like operable louvres and floor-to-ceiling sliding door/windows allow the home owners to take a full control over the building skin to achieve the intended indoor air and light quality, according to different time of the day and



Floor to ceiling sliding doors to allow sunlight to flow in

weather. Operable louvres shade the building from the sun, and block heavy rain. It is also openable to allow unobstructed view to the neighbourhood.

Construction materials were mostly procured from local sources, for example the teak wood flooring; the fair-faced bricks; balau timber strips; nyatoh table top; concrete vent blocks; upcycled railway sleepers; and polished concrete floor. These materials retained their original appearances, with complementing materials reinforcing their natural features.

The major challenge in the construction was to reuse part of the building structure. The major take is moulding liveable spaces into the existing RC column, beam and slabs so that the ensemble can complement one another. The solution was to reuse part of the original building structure and transform the low headroom split-level bungalow into a bright and airy living space. 📍



Furniture with retained original appearances



Living room with the courtyard in the background

#### PROJECT DATA

**Project Name**  
Zen House

**Location**  
Kuala Lumpur

**Completion Date**  
October 2019

**Site Area**  
558 square metres

**Gross Floor Area**  
800 square metres

**Building Height**  
3 storeys

**Number of Rooms**  
7 rooms

**Owner**  
Private Owner

**Architecture Firm**  
Wan Hui Architect

**Principal Architect**  
Ar. Chong Wan Hui

**Civil & Structural Engineer**  
JPS Consulting Engineers  
Sdn Bhd

**Lighting Consultant**  
Wan Hui Architect

**Landscape Architect**  
Wan Hui Architect

**Main Contractor**  
Naruda Jaya Construction  
Sdn Bhd

**Images**  
Benedict Chan

# NATIONAL ARCHIVES OF SINGAPORE

National Archives of Singapore (NAS) was a primary school from 1892 to 1993, gazetted for conservation on 21 November 1993 and started to house archives in 1997. NAS has been undergoing significant changes, but planning and execution works were carried out beforehand to ensure that the '3R' Principle: the maximum retention, sensitive restoration and careful repair of the key architectural elements, are carefully coordinated. Facilities such as lift, ramps, and disabled toilets were introduced to ensure that the conservation building is compliant to the Universal Design guide set out by the Building and Construction Authority, and the retrofitted modern facilities are tucked away inconspicuously in the conservation building.

## RECORD-INSPIRED DESIGN

The design of the façade took inspiration from the restoration and reinstatement of the conservation block as well as the importance of the priceless records stored in the repository. The choice of colour considered the muted tonality of the conserved block while tastefully giving a hue of contemporary. The folded aluminium bronze panels represent the layers of history stored inside, which are also a key architectural feature across various key public spaces to express the layers of intimacy between the past and the contemporary.

Another key that drove the design of the NAS was enhancing the green connectivity to Fort Canning Park. The context



The old structure was reinforced and the Art deco impression was retained





Entrance to the theatre made from aluminium bronze panels

design strategy takes advantage of the green space behind NAS and celebrates the green linkage with the city space. The greenery at the rear end of NAS that was enhanced the through block allows pedestrians to feel the seamless connection between 1 Canning Rise and Fort Canning Park.

#### **RETAINED, RESTORED, REINSTATED**

Conserved buildings are tangible evidence of historical footprints so it is paramount that conserved buildings retain as much of the building's character and presence. Some of NAS' features that were retained to preserve the Art deco expression in the 1950s include: the vertical windows, the flag post and the circular windows in the bathrooms.

The original building in 1959 had a shell roof veranda that was lost in 1997. This veranda was one of the features that was restored, which was then given a new name: The Scallop Canopy. The shell roof was cast on-site instead of being pre-fabricated because each shell is unique, referencing the unequal existing column grid spacing. This also allowed the flexibility to control the thickness at only 125 milli metres, just like in the original drawings dated in 1955. The Scallop Canopy is then used as a shelter for the 28 bicycle lots, previously designed to support the Walk and Cycle plan

initiated by the Land Transport Authority. Meanwhile, the original footing location of the columns to the shell roofs is now used for a generator and a switch room.

The front façade in 1997 used to have glass panels of nine divisions in aluminium frames. The top-hung glazed panels were reinstated, made into six divisions in mild steel. The original glass was clear with a green tint, but it did not match with the specified requirements so glass in a darker shade of grey was selected to replace the glazing on the front façade.

#### **STRENGTHENING THE OLD STRUCTURE**

The conservation block was built between 1955 and 1959. The built structure was a four-storey reinforced concrete frame and metal roof with pad footing for all column supports. As part of the due diligence of the consultants and the contractor team, various tests were carried out to ensure that the 60-year-old structure was still intact and able to fulfil the current day code compliance.

Unfortunately, the results of the test were below the acceptable range. Therefore, structural strengthening was done to ensure that the conservation building structure complies with the code of practice. The structural strengthening works



Theatre with larger capacity and an enhanced audio system



Bright colour to add vibrancy



The connection to the nearby parks



The Scallop Canopy

include new additional rebar installation, concrete jacketing, fibre wrapping and fire proofing. Additional steel beams were also used to strengthen the building structure.

### COMMUNITY ENGAGEMENT

NAS not only houses valuable records, but it is also committed to community engagement. The restoration and reinstatement were in line with these purposes. The Oldham Theatre was designed to screen historical films as well as to celebrate the arts. The screening of such films gives an opportunity for people to learn about history, appreciate and support local arts. In order to enhance the theatre experience, the Oldham Theatre was designed to house a larger capacity of audience, increased from the original 44 seats to 132 seats with two wheelchair spaces.

The new recording studios were designed for the public to voice their stories and history. The experiences and stories of people's everyday lives unveil a glimpse of Singapore in the past and how they impact our lives today. The new technology enhances the acoustic treatment and the sound systems capture the details and essence of each interview. Such spaces were also designed with the interviewees' comfort in mind for enhanced sharing experiences. 📍

### PROJECT DATA

**Project Name**

The National Archives of Singapore (NAS)

**Location**

1 Canning Rise (near Fort Canning)

**Date of Completion**

29 March 2019

**Site Area**

6131 square metres

**Gross Floor Area**

8,214 square metres

**Building Height**

4 storeys

**Client**

National Library Board

**Architecture Firm**

RSP Architects Planners & Engineers Pte Ltd

**Interior Design Firm**

RSP Architects Planners & Engineers Pte Ltd

**Civil & Structural Engineer**  
RSP Architects Planners & Engineers Pte Ltd

**Mechanical & Electrical Engineer**  
Squire Mech Pte Ltd

**Quantity Surveyor**  
WT Partnership (Singapore) Pte Ltd

**Green Building Consultant**  
RSP Architects Planners & Engineers Pte Ltd

**Main Contractor & Interior Fit-Out Contractor**  
Sunray Woodcraft Construction Pte Ltd

**Images**  
National Archives of Singapore



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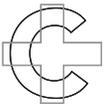
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The main drop-off



# NEX TOWER

The building is located in Makati City, Manila's central business district, where revitalization is rapid as international enterprises are moving in and spurring a new density in the zone. As populations grow and cities become more complex, architects and engineers have the responsibility to prioritize not only the physical but also the psychological well-being. NEX Tower is oriented toward this principle. It aims to create uplifting, healthy and beneficial environment to its dwellers.

Designed to support responsible and sustainable development, NEX is expected to change the way developers and designers approach their work in the Philippines, because amenities such as health, wellness, connection to nature, and access to uplifting spaces are not just for building tenants but also for the general public.

The building form is simple but strong, tapering back to create a distinctive and iconic silhouette against the city skyline. The exterior wall is energy-efficient and this has contributed to the building's LEED Platinum certification. Floor-to-ceiling glass panelling allows abundant natural daylight to flow into the office spaces while efficiently managing solar heat.

The complex occupies an infill site, reducing its frontage to the front and back. The building was sliced open on the ground floor to create a soaring lobby that connects the rear drop-off area to the pedestrian entrance at the front. The lobby operates as a pseudo public space, increasing porosity and connectivity in a dense urban setting. In addition to this, there is a living wall that provides freshness as well as natural beauty.

The interior living wall gives the city people an opportunity to stay close to nature, breathe in fresh air, and find respite from the congestion of Ayala Avenue. Green terraces, such as the roof gardens on the 4th floor and 27th floor, provide similar ambience and these were carefully placed in the most strategic locations.



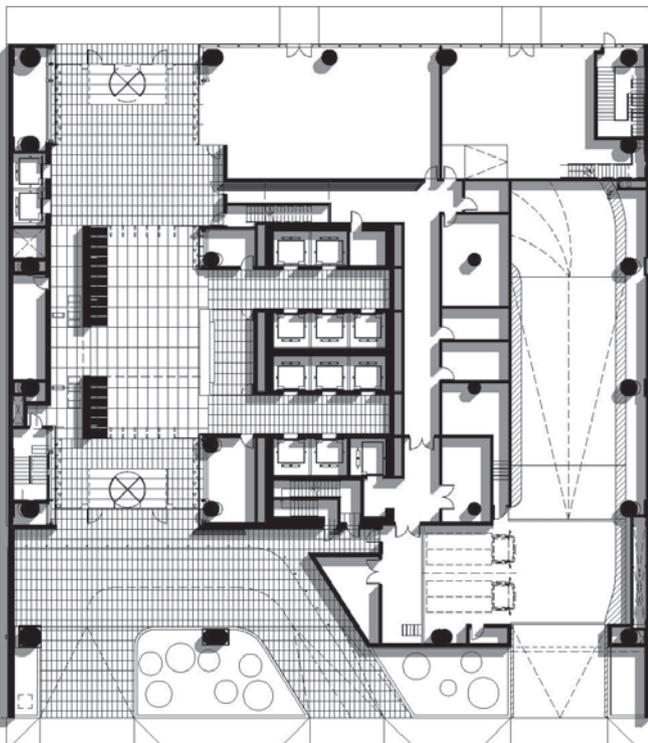
The project material includes white marble from Macedonia, glass from China, and local plant species for the green wall. These materials were specifically chosen to achieve a minimal and refined impression. The interior places an emphasis on the beauty of those natural materials, whose effects are heightened by the natural light.

In terms of technical challenges, the design team faced two obstacles. First, 100 per cent of the car park had to be placed below grade to create the grand public lobby. This was particularly challenging as the basement excavation depth had exceeded 25 metres. Upon excavation, the construction team discovered that the adjacent foundations encroached on the property. Adjustments had to be made to reinforce the existing and new foundations.

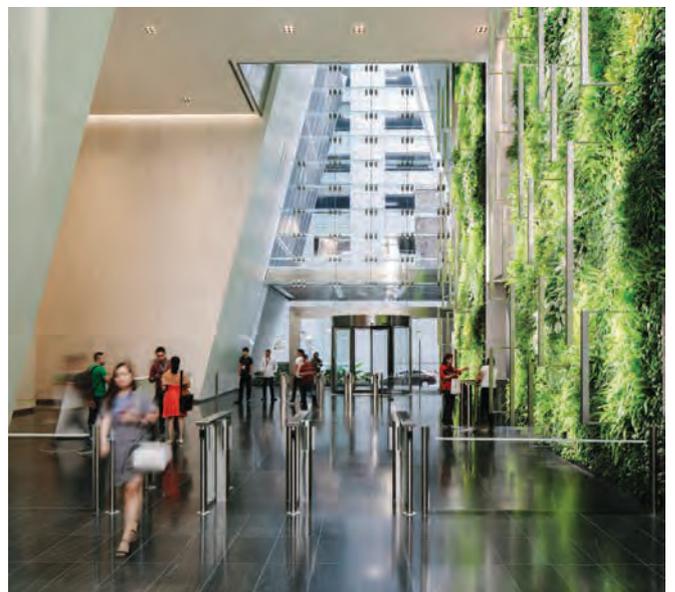
The second challenge was installing the 11-metre-tall living wall, the largest of its kind in the Philippines. Experts from Singapore were called in to execute the plan because they were the ones with sufficient expertise. Also, due to the limited amount of direct sunlight, the team had to choose the right plants, and calculate artificial light levels, impact on humidity, and mechanical systems and maintenance program. While maintenance was a critical factor, nearly no plants had to be replaced after over a year in operation. 



The grand lobby



The ground floor plan



The living green wall



The tower gently tapers back to create a striking crystalline form that faces towards the public park

## PROJECT DATA

### Project Name

NEX Tower

### Location

Ayala Avenue Makati City,  
Metro Manila, Philippines

### Completion Date

May 2019

### Site Area

2,400 square metres

### Gross Floor Area

38,400 square metres

### Building Height

27 storeys; 124.45 metres

### Developer

Nex Development Group  
(Nova Group - VelcoAsia JV)

### Managing Director

Ricardo C. Cuerva

### Design Consultant

Skidmore, Owings &  
Merrill LLP (SOM)

### Executive Architect of

#### Records

Roy Villarosa Architects

### Civil & Structural Engineer

SY^2 & Associates

### Mechanical & Electrical

#### Engineer

RTM Mechanical  
Engineering Services

### Lighting Consultant

SBLD Studio

### Landscape Architect

Vertical Green  
(green wall consultant)

### Green Building Consultant

Barone International

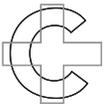
### Main Contractor

Nova Group

### Images

Photo © Studio Periphery

Image © SOM



Oblique angles on the facade



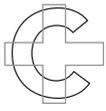
## Y/A/O RESIDENCE

**Y**/A/O Residence stands on a 1,300-square metre site in a sparse suburban area. The owners wanted a house that accommodates friends and relatives who will come to visit and stay over. As long as this function was considered, they would not limit the form expression and experimentation. The architect took this opportunity to design a house with their personal taste. The letter Y refers to the word why; the letter A means architects; and the letter O refers to the word oblique. The project name is the architects' cryptic reference on the design that plays with oblique lines and angles.

The architecture has no contextual limitation because the house is located in a new residential area with little historical or cultural context. The house is divided into three buildings that surround a swimming pool—the main residence, the guest house and the garage. The overall living space takes up half of the site area. The guest house and the main residence, whose façade is made of framed glass, face west and northeast respectively so they are not subject to solar heat gain.

### THE OBLIQUE ANGLES

The architects observed that the use of oblique angles was increasingly popular, but this was mostly applied on exterior decorative elements. They wanted to translate this architecture language into the configuration of the structure so that it shows in both exterior and interior. To achieve the desired angularity, the courtyard became a central feature of the house. The frames of the courtyard were made lower than the frames of the building so that the sloping roof allows the rain to flow into the courtyard like a waterfall. At the front, the walls were drawn diagonally, connecting each of the building's corner with its adjacent courtyard's corner, subtracting the mass at an oblique angle. This and the ceiling planes, which were made parallel to the sloping roof, create the oblique impression on the façade.



Open design at the dining area

The angles appear not only on the façade, but also in many other parts of the buildings. As soon as visitors enter the garage, they can see the tilted angles of the walls that create a tapering look. The second floor of the main residential building was also designed in a similar approach.

### THE OPEN PLAN

The main residence's bedrooms and fitness room face north, overlooking the swimming pool and the main garden. The restroom, dressing room and shower are situated in the south to block the afternoon sun. Next to the swimming pool are the living room, dining room and the pantry, configured in an open plan, separated from the outdoor by an accordion door. Because the building faces the direction of the north winds, the breeze will flow in unobstructed and this should reduce the use of air-conditioning.

The second floor was designed with the courtyard as the central point, which is why it reflects the idea to the largest extent, with tapering walls and sloping ceiling. The dry bathroom facing the courtyard is also open, with a rolling door that can be drawn for more privacy.

### THE MATERIAL TOUCH

Floors were covered with wood and artificial wood slats in

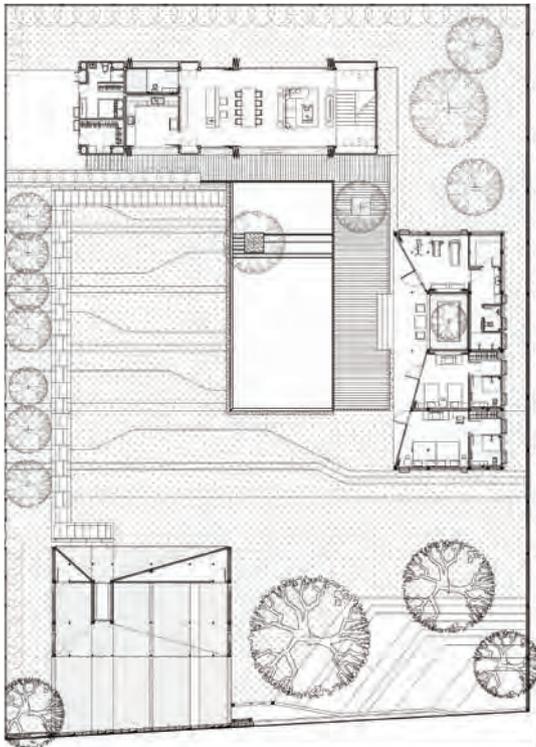


Plants with less foliage were chosen for unobstructed view of the house

most of the areas. Fibre cement was used as the main material for the walls. The exterior walls were covered with aluminium cladding, with a glossy surface to enhance the finished look. Some of the interior walls were made of wood pieces arranged vertically with unequal spacing. In other parts, the walls were made of plastered cement with a matte black finish. 



The sloping roof



The site plan

**PROJECT DATA**

**Project Name**  
Y/A/O Residence

**Location**  
Sukhaphiban5 Road, Soi70,  
Sup-District Ao Ngoen,  
District Sai Mai,  
Bangkok 10220, Thailand

**Completion Date**  
2019

**Site Area**  
1,300 square metres

**Building Height**  
2 storeys

**Clients**  
Nongyao Nevilai;  
Somchai Nevila

**Architecture Firm**  
Octane Architect & Design

**Principal Architects**  
Kittichon Phukiatkong;  
Thawin Harnboonseth;  
Photsawat Apariman

**Images**  
Rungkit Charoenwat

# 俊和

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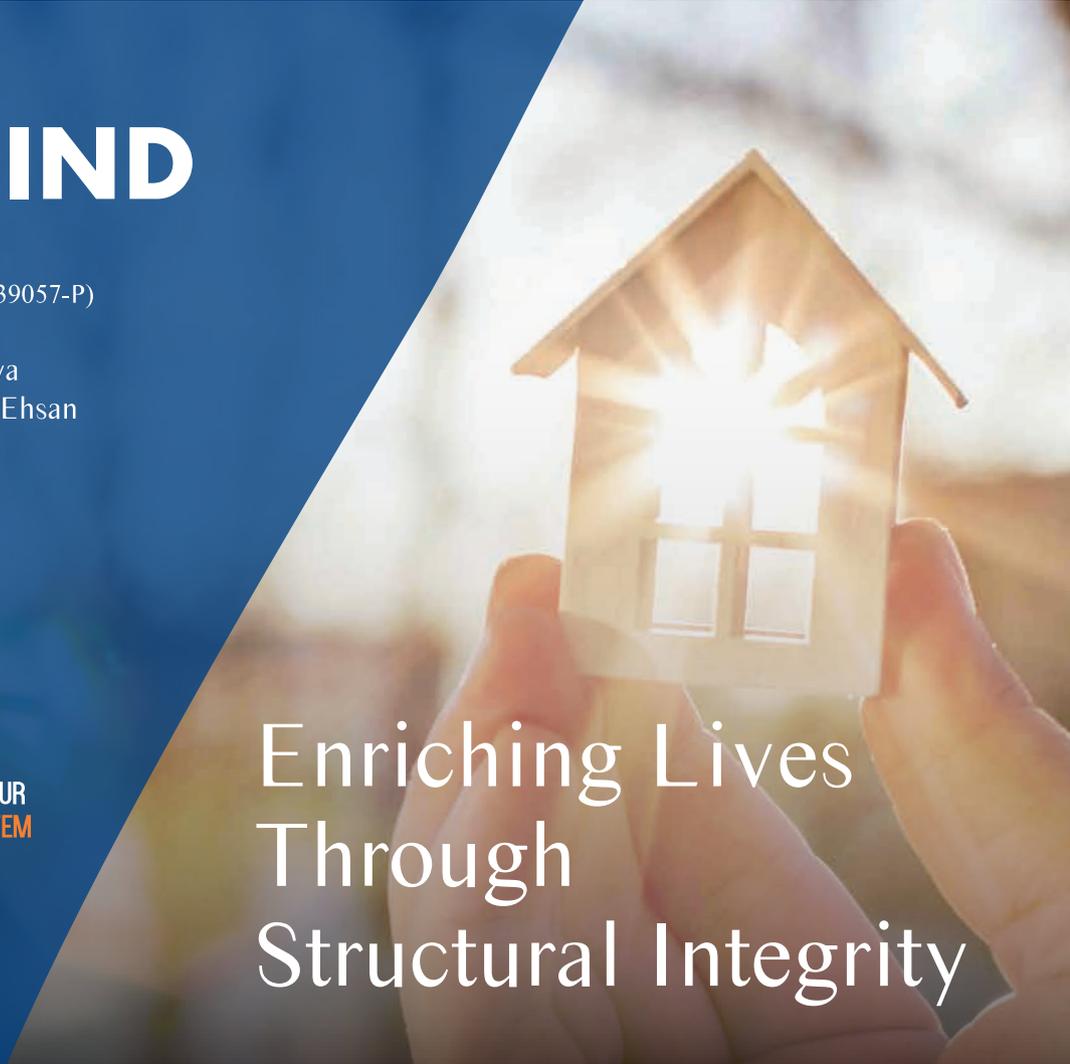
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## Rethinking Light

Lighting mood for magnetic docking: The perfectly dimmable Plug & Light LED wall luminaire redefines lighting design.



The lobby that can serve as a coworking space



## LYF FUNAN SINGAPORE

Lyf Funan Singapore is a response to the growing trend of co-living, lifestyle, and travel habits among millennials. The hotel/co-living space with young people's social life in mind so there are plenty of spaces to mingle and to take pictures for social media.

Since lyf Funan Singapore is located in Funan Mall, the design alludes to the industrial style but with a more playful slant to suit the target customers' characters. This idea is combined with a touch of locality, consisting of a collage of materials of various texture, patterns, and colours; and furniture made by local designers and artists.

### COMBINING LIVING AND COWORKING SPACE

At the entrance is a laundromat instead of a reception that becomes a central point—unusually placed to evoke curiosity. Referred to as Wash & Hang, the public laundry room can also function as a place to hang out. Meanwhile, the lobby is an open coworking space that can be reconfigured into an event space when needed. For more privacy, there are timber and steel boxes that serve as a meeting or workshop rooms.

Common areas on the upper levels can also function as a stage for presentations and small group gatherings. On the fifth floor, there is a communal kitchen with a dining area that can be used daily and rearranged into a classroom when there is a cooking lesson. Scattered around the public spaces are custom-built furniture designed for fun activities, such as the human-sized hamster wheel in the gym.

### DESIGNED FOR YOUNG PEOPLE

The rooms are intended to be efficient and functional, addressing the essential needs for a long-term stay. Just like most hotels designated for young people, lyf Funan Singapore offers a bunk bed option for residents travelling in pairs. There is also a dorm option for those travelling in groups; or for colleagues travelling for a temporary project or corporate retreat trip. The apartments sizes vary, housing two to six bedrooms, a common room and a kitchenette. There is also a studio with ensured privacy. What's probably unique to lyf Funan Singapore is that this studio is equipped with a gaming console.

References to industrial impression is visible in the public spaces and the hotel rooms. Timber and metal boxes, cast iron, steel beams, exposed exhaust pipes on the ceiling, assorted furniture pieces are all coordinated accordingly. A distinctive feature is the quotes and puns scattered around the hotel. This is designated for young people who like posting pictures of quotes on social media. 



Common area that can be configured into an event/workshop space



The six-bedroom apartment



Allusion to the industrial style



## PROJECT DATA

### Project Name

lyf Funan Singapore

### Location

67 Hill Street, Level 4  
Funan Mall, Singapore

### Completion Date

September 2019

### Gross Floor Area

11,347.4300 square metres

### Building Height

9 storeys

### Number of Rooms

329

### Hotel Operator

Ascott International  
Management Pte Ltd

### Developer

Capitaland Retail Project  
Management Pte Ltd

### President & Group CEO

Lee Chee Koon

### Architecture Firm

RSP Architects Planners  
& Engineers Pte Ltd

### Principal Architect

Ng Meng Hui

### Retail Interior Architecture

Woods Bagot Asia Ltd

### Hotel Interior Architecture

Farmwork Pte Ltd

### Civil & Structural Engineer

RSP Architects Planners &  
Engineers Pte Ltd

### MEP Engineer

Alpha Consulting Engineers  
Pte Ltd

### Quantity Surveyor

Arcadis Singapore Pte Ltd

### Lighting Consultant

Nipek Pte Ltd

### Landscape Architect

Grant Associates Pte Ltd

### Green Building Consultant

Building System and  
Diagnostics Pte Ltd

### Demolition Contractor

Neo & Goh Construction  
Pte Ltd

### Main Contractor

Woh Hup-Obayashi Joint  
Venture

### Interior Fit-Out Contractor

DSG (Design Studio Group)

### Images

lyf Funan Singapore



The bunk bed



The grand lobby



# THE PRESTIGE HOTEL

The Prestige Hotel is located 25 minutes from Penang International Airport, in an area that is culturally and contextually rich. The ground floor of the large building block is allocated for retail stores and dining, and the first four floors for hotel rooms and amenities.

As a new building, The Prestige Hotel has to adhere to Penang's city planning guidelines that require newly built architecture to assimilate into the surrounding historic context. Therefore, the hotel's design alludes to the heritage style.

## REDEFINING VICTORIAN LOOK

Set in Georgetown's UNESCO World Heritage site, among the 19th-century English colonial buildings, The Prestige Hotel sets itself apart from other hotels by sporting a modernised Victorian look. Its design neither mimics a heritage building nor is it entirely contemporary, but a combination of the two styles.

This is mainly carried out on the ground floor where the lifestyle stores adopt the shop-in-shop concept similar to that of the historical English shopping arcade. The hotel lobby's floor has a large maze pattern made from marble-clad and brass trimming, which emulates a hedge maze from the English renaissance.

The Glasshouse Restaurant was inspired by the Victorian conservatory, with walls and glazing being framed with white metal lattices. This is combined with a tropical touch to create a different kind of Victorian look—a conservatory garden but with palm leaves and tropical lush garden.

Bronze-tinted metal makes up the frames and mullions in the lobby and the hotel rooms. This colour is dominant against the white background, used mostly for decorative elements. The walls are wainscoted, but the patterns are angular instead of the more common linear ones. The definitive trapezoidal wainscot contributes to the overall modernised Victorian impression.

### OVERCOMING A LAYOUT CHALLENGE

The oblong building block and the layout have made the hotel's corridors long and narrow, which may make navigating them feel monotonous. To overcome this, the walls and floor are coloured in alternating dark grey and white in such a way that creates an effect akin to infinite mirror reflections. There is also a mechanised light feature that rotates and casts shadows of intricate lattice patterns on the walls.

The studio's layout is also rectangular. To compensate the narrowness, the studio is accentuated with visual illusion and element of surprise. For example, the bed looks as if it is suspended in the air; and there are doors that look like a wardrobe but they actually lead to toilets or pantries.

This element of surprise is carried forward to other parts of the hotel, from the reception desk that seems to balance itself on balls to the concave mirrored counter that creates a distorted reflection. Overall, the solution to the layout challenge by using visual illusion seems to be an integral part of the design.

### MAXIMISING NATURAL LIGHT

The Prestige Hotel utilises alfresco spaces for dining or dwelling to minimise air-conditioning. The shopping arcade is designed as standalone storefronts interconnected by naturally ventilated walkways. Bay windows were installed at the lift landing to allow sunlight to shine through. The car parks are open and ventilated to reduce the use of blowers and lighting. Fluted glass is fitted in the function room to maximise natural lighting during the day. 



Combining the use of white metal lattices and tropical plants and colours



Trapezoidal wainscot and bronze-tinted decorative elements in the bedroom



## PROJECT DATA

### Project Name

The Prestige Hotel

### Location

Penang, Malaysia

### Completion Date

May 2019

### Site Area

3,725 square metres

### Gross Floor Area

8,570 square metres

### Building Height

5 storeys

### Number of Rooms

162

### Client

Public Packages  
Holdings Berhad

### Architecture Firm

KL Wong architect Sdn Bhd

### Interior Design Firm

Ministry of Design Pte Ltd

### Civil & Structural Engineer

L.o.t consultant

### Mechanical & Electrical Engineer

GH Consultants Sdn Bhd

### Quantity Surveyor

Unitech QS Consultancy  
Sdn Bhd

### Main Contractor

Goodwood Builders Sdn Bhd

### Interior Fit-Out Contractor

Pena Builders Sdn Bhd

### Images

Edward Hendricks from  
CI&A Photography



Toilet behind a door that looks like a wardrobe

# HEYTEA DAYDREAMER

Heytea Daydreamer is a tea shop/bar located in the historic district of Clark Quay, which used to be the busiest port in Singapore in the 19<sup>th</sup> century. Within the shop's walking distance is a lighthouse situated on the Fort Canning Hill, from which the design inspiration of Heytea Daydreamer was drawn.

In the past, the lighthouse provided guidance to sailors and pilots, a beacon to navigate boats and ships to the seashore. Heytea Daydreamer translates this idea into a business concept; and this is subsequently reflected in its design. Situated on a busy street packed with dimly lit bars, the tea shop stands out as it gleams with white light.

## DESIGNED AROUND LIGHTING

Designed to be visually distinctive, the lighthouse impression is mainly created from the project's use of light. The brightness makes the shop seem out of place, but a more striking feature is the lights that dim and glow alternately every 15 seconds. Not only does this resemble a lighthouse, but it also creates playful vibes that are consistent with the bar street's atmosphere.



Rows of lights that look like lighthouses



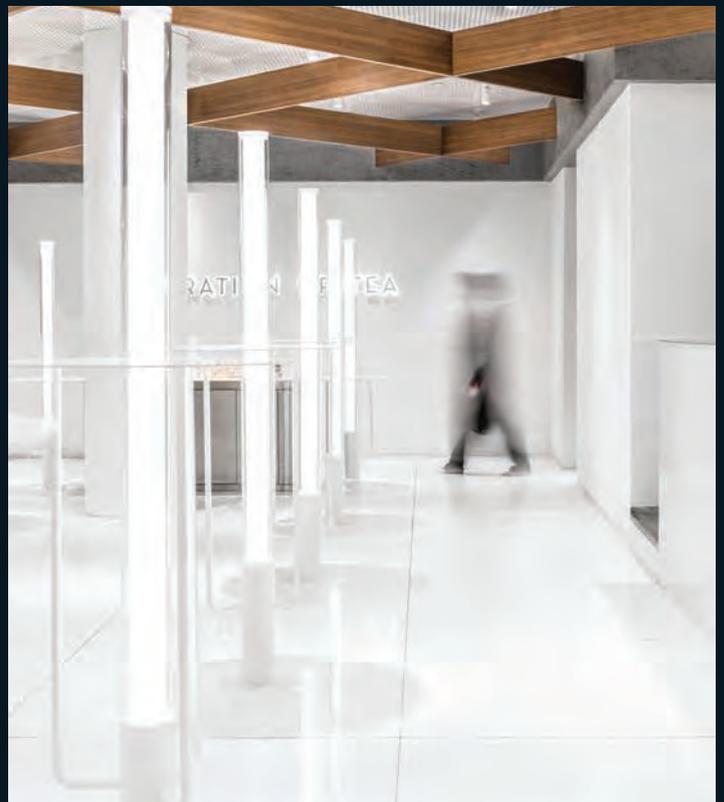


The sandblasted steel furniture

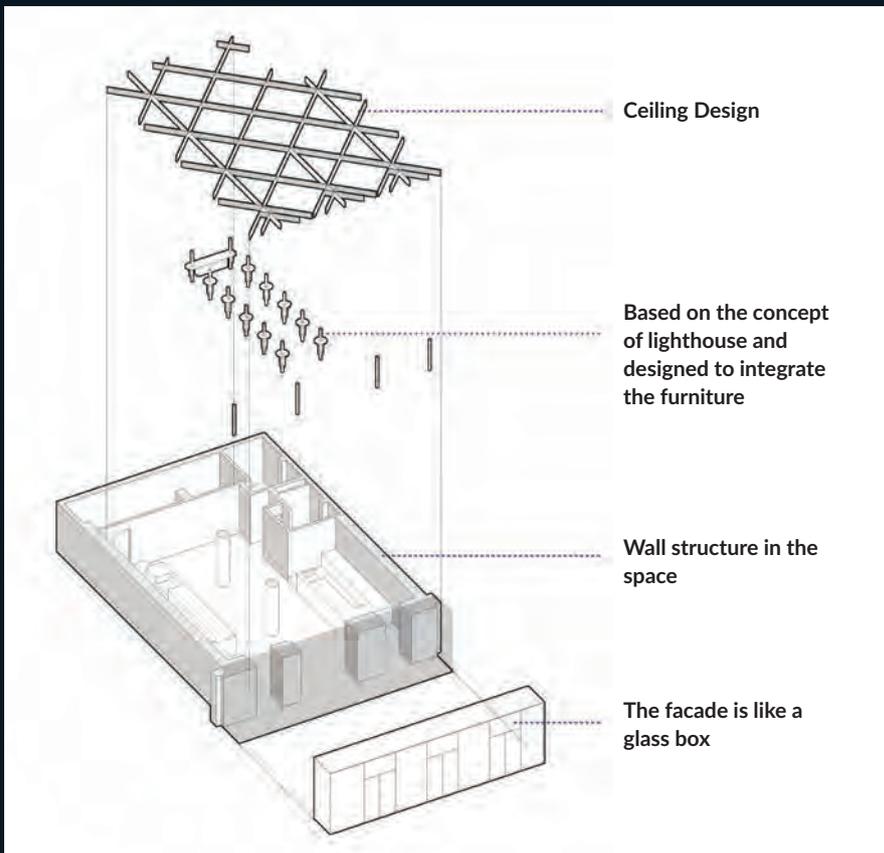
The façade is made from borderless glass that creates a clean look. The minimalist signages allow attention to be drawn more to the illumination. The white furniture blends with the walls. There are long vertical lights installed that are parallel with the centre, which the designers claimed to resemble lighthouses. The ceiling is made from white perforated aluminium and wooden blocks. The brown wood blocks stand out in the predominantly white interiors, arranged in a pattern of intersecting lines that emulates a lighthouse's moving lights.

#### A TEXTURED FINISH

The shop's original building has circular columns with visually rough texture that represents the old architecture of the historic area. To match the preserved columns, the interior walls were finished with textured paint. Other parts of the interior are made of white artificial stone and sandblasted steel to complement the overall look and feel. The perforated aluminium ceiling not only enhances the look but it also hides the air vents above it. 



The tables are almost invisible in the white background



Design concept that is inspired by the lighthouse

**PROJECT DATA**

**Project Name**  
 HEYTEA Day Dreamer Project  
 at Clarke Quay Singapore

**Location**  
 Block A, 3 River Valley  
 Road, #01-06, Clarke Quay,  
 Singapore

**Completion Date**  
 January 2019

**Site Area**  
 250 square metres

**Interior Design Firm**  
 MOC DESIGN OFFICE

**Principal Designers**  
 Sam Liang; Vivi Wu

**Images**  
 MOC DESIGN OFFICE



A minimalist signage on a wall with a textured finish

# HILLSIDE BUNGALOW

Penang Hill boasts bungalows in various styles including the colonial, the Asian and the modern minimalist ones. Hillside Bungalow is one of the classics that showcases the British colonial style and the use of high-quality materials.

Built in the early 1900s, the bungalow is one of the oldest on Penang Hill and is classified as a Category II heritage building in the Penang Hill Local Plan 1998 and Penang Hill Special Area Plan 2016. The house was once used as a rest house for British government officers. After independence, it was turned into a rest house for public servants, but was left vacant thereafter.

## ECLECTIC AND VINTAGE

The main objective of the restoration was to turn the building into a comfortable bungalow while preserving the classic design. The designers spent a lot of time researching vintage furniture and combing second-hand shops. Antique pieces and elements were curated carefully to conjure up the eclectic taste.

Every piece was vintage, often handmade by skilled carpenters so they were of a high quality. Rich dark brown furniture against chalky white plastered walls creates good tonal variation that becomes a focal point of the colonial style.



Vintage furniture to match the building's colonial style





Antique pieces and elements curated from second-hand shops

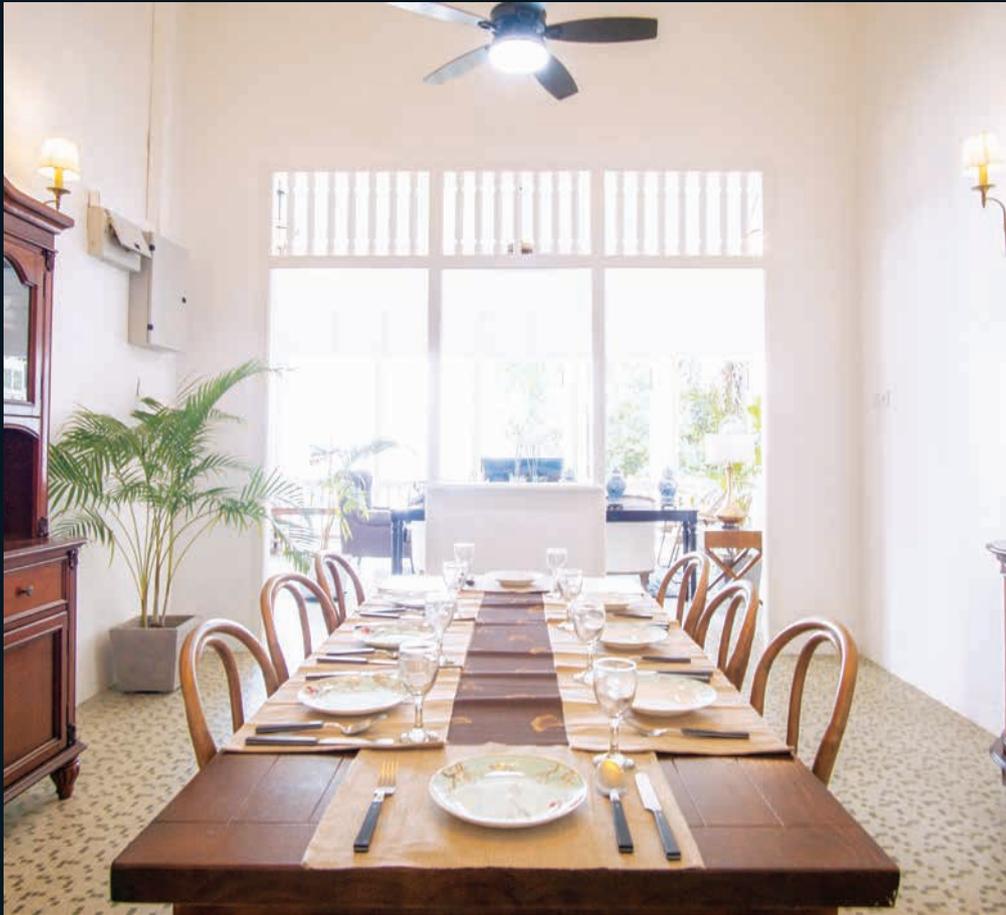
### PRESERVING HERITAGE

Restoration of a building with historical and cultural significance means preserving its heritage and charm, hence this means maintaining the original structure and fabric as much as possible. As originality is at the heart of the design, the interior and exterior of each space were carefully assessed to determine what to retain and remove. In the end, additional walls, ceilings and other recent features were torn down so that the original features could be highlighted.

Another important aspect to consider was the conditions of the old structure. Proper assessment of the roof structure was conducted to check if there was a damage. Termites appeared to be the main problem that deteriorated the wooden blocks. Therefore, roof rafters, associated eaves and gutters were replaced with new ones. 📍



Combination of modern and classic



Wooden furniture at the dining area



The original structure

## PROJECT DATA

**Project Name**  
Hillside Bungalow Restoration

**Location**  
Lot PT34, Bandar Bukit  
Bendera, D.T.L,  
Pulau Pinang, Malaysia

**Completion Date**  
8 January 2020

**Site Area**  
2,887 square metres

**Gross Floor Area**  
373.10 square metres

**Building Height**  
1 storey

**Number of Units**  
1

**Client**  
Perbandanan Bukit Bendera  
& Pembinaan YSBT

**Architecture Firm**  
Mei Ee Architect + Thesis  
Architects Sdn Bhd

**Principal Architect**  
Ar. Loh Mei Ee

**Interior Design Firm**  
Mei Ee Architect + Thesis  
Architects Sdn Bhd

**Principal Designer**  
Ar.Loh Mei Ee

**Designers**  
Ahnaf bin Samsury;  
Nur Amalina binti Faud;  
Tan Megan Alexandra; Lee  
Thean Choon; Lau Kai Xin;  
Nurardini Raihana binti  
Rosmadi; Muhammad Zahid  
Anwar bin Shukri; Khor Yong Yin

**Civil & Structural Engineer**  
Perunding GT Sdn Bhd

**Main Contractor**  
Pembinaan YSBT (M) Sdn Bhd

**Interior Fit-Out Contractor**  
Sanpo Retreat Venture

**Images**  
Ahnaf Bin Samsury; Leow Tirng  
Weei; Ken Yeoh; Ar. Loh Mei Ee

# NATIONAL UNIVERSITY OF SINGAPORE CENTRAL LIBRARY

National University of Singapore (NUS) Central Library is a multidisciplinary library serving the knowledge and information needs of the university community. Students' academic life on campus is often centred around the library so it has a deep connection with them and forms part of their journey during their time in NUS.

Contemporary libraries around the world are reinventing their physical spaces. They have to provide versatile spaces that support a wide range of users' learning and research activities while accommodating rapid advances in information technology. In response to such foregoing trends, NUS Central Library is reinventing itself to remain relevant and to stay ahead.

## PRIORITISING VERSATILITY

The objective of this project is to retrofit six levels of the existing NUS Central Library building. The overarching theme is modern contemporary and timeless design, with a touch of Asian culture. Local traditions and cultures take precedence in the design as it falls within the context of Singapore's multicultural community. The key design model for the spaces is to redefine learning commons into full-service hubs for learning, research, engagement and collaboration. In doing so, the spatial design prioritises versatility. Spaces are designed in such a way that they allow for reconfigurations into different functions such as gathering or event spaces, workshops or meeting rooms, computer lab or makerspaces. This is to support a wide variety of learning activities, and to allow collaborations and discoveries because the future of NUS Central Library is to be an arena equipped with cutting-edge technology and flexible spaces that sustain the advancement of research and the creation of new knowledge.



Portable furniture makes it easy to transform the space for other functions





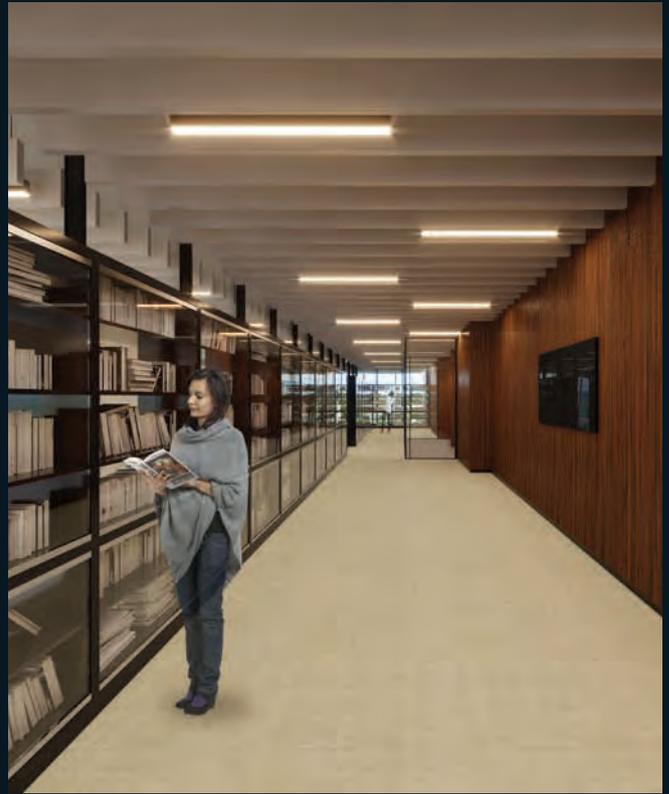
The cafeteria

### ENCOURAGING RESEARCH AND COLLABORATION

The ground floor is designed by keeping in mind the seamless connectivity between the main road, that is Kent Ridge Crescent, and the outdoor public space called the Forum. The design enables students, staff, the public, as well as the physically disabled, to have easy and safe access to or through the library.

The extended front façade has been purposely tilted to embrace the rectangular columns, creating dynamism in the entrance. From here, visitors are immediately welcomed by the spacious Galleria. This now-doubled space is flooded with natural light from the two ends of the façade and is beautified by the continuation of the tubular ceiling flowing from the Forum. The Rare Books Display on the second floor stretches along the frontage, showcasing a collection of over 61,000 titles that inspires learning. The full-height glass maintains not only extensive view of the collection, but also a visual connection with the Galleria and the people at the Forum.

The first-floor space has been reconfigured into a living room that is welcoming, warm and safe, and is intended to support the social aspects of learning, such as hosting temporary exhibitions and events. The architecturally rich design accommodates students and faculty members to innovate learning through a combination of research and collaboration.



The book collection at the Rare Books Display

### MAXIMISING COMFORT

The interior charms come from the use of timber laminate, soft fabric, woven floor vinyl and Asian-inspired colour combination. The ceiling, columns and walls are painted white or in light colours, not only to make the space appear larger, but also to direct users' attention to the rich texture and the interaction of different materials.

Comfort is one of the most important factors in designing the spaces. The contemporary yet mindfully Asian designs, along with the thematic furniture, good lighting, colour and acoustics, conjure up congenial ambience and maximum comfort. The wall and floor remain in neutral colours, juxtaposed with bright furnishings to spark vibrancy. The furniture is durable, with classic and simple designs that match the overall library interior.

The types of lighting fixture and arrangement were chosen based on the usage of space, integrated with the ceiling services like air diffusers and exhaust ducts. Stacks and study areas are illuminated by gentle lighting. Localised areas such as reading lounges and carrels are basked in warm colours to stimulate cognitive processing.

As NUS Central Library not merely provides a quiet haven for book lovers, but also spaces for collaboration and research, it could be noisy. To solve the acoustic problems, loud and quiet activity areas are separated. The first, third



The Rare Books Display as seen from the spacious Galleria



The extended front facade

and fourth floors are allocated for collaborative activities, whereas the fifth and sixth floors are assigned for quiet reading or studying. Additionally, acoustic materials for ceiling and flooring were carefully selected and installed to cancel noise.

### OVERCOMING CHALLENGES

As NUS Central Library seeks to be less book-dominated and more user-orientated, greater attention is paid to the users' experience and service spaces. Furniture is movable to allow multifunctional use of space. Vertical screens are rotatable to allow for pockets of spaces. Flexibility is the key to cater the ever-growing needs from various groups of users.

Another challenge was for the proposed conceptual designs to adapt to the actual space and constraints. Strategic planning and design were needed to anticipate change and to ease construction process on site. Therefore, practical needs of the library were carefully identified and the language and meaning of designs were translated into clear design goals. To formulate such goals and to ensure that these were achievable and affordable, the consultant team worked closely with the librarians. The rule of thumb was to design all components, from ceiling panels and floor vinyl tiles to façade glazing and integrated air diffusers, in modules or standard sizes to increase productivity and efficiency during installation. 

### PROJECT DATA

#### Project names

National University of Singapore Central Library

#### Location

Kent Ridge Crescent, National University of Singapore

#### Status of Construction

Construction Works - Phase 1

#### Expected Completion

1st Quarter 2020

#### Site Area

1,405,920.3 square metres

#### Gross Floor Area

30,470.29 square metres

#### Building Height

6 storeys

#### Client

National University of Singapore

#### Architecture Firm

Architects 61 Pte Ltd

#### Principal Architect

Michael Ngu

#### Interior Design Firm

Architects 61 Pte Ltd

#### Principal Designer

Gieto Sugianto

#### Civil & Structural Engineer

KCL Consultants Pte Ltd

#### Mechanical & Electrical Engineer

BECA Carter Hollings & Ferner

(SEA) Pte Ltd

#### Quantity Surveyor

CPG Consultants Pte Ltd

#### Green Building Consultant

Architects 61 Pte Ltd

#### Main Contractor

Gennal Industries Pte Ltd

#### Interior Fit-Out Contractor

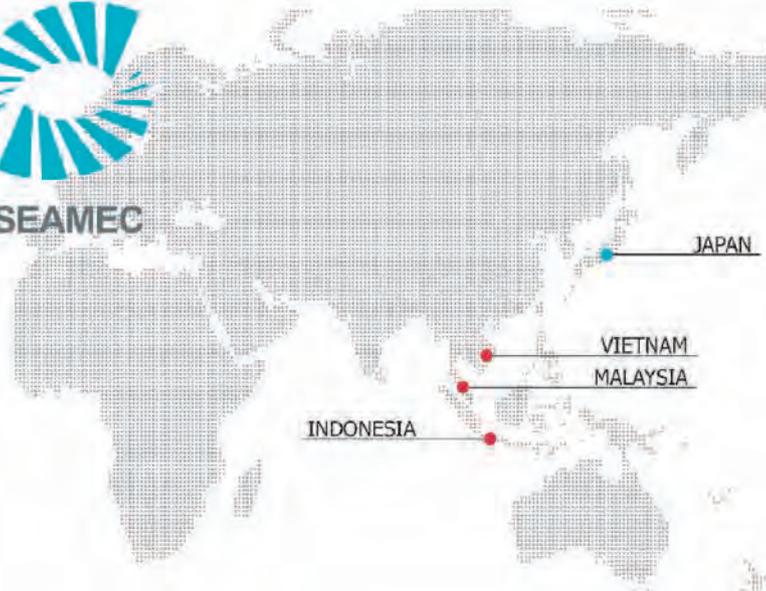
Enlighten and Liberty

#### Images

Architects 61 Pte Ltd



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## DWP OFFICE

Moving to a new office, the architecture and design firm took the opportunity to walk the talk on digital transformation to convert a conventional office into an agile working environment. The ultimate goal was for the office to not only become an enviable setting for their clients to emulate, but also to show how digital transformation and the use of cloud-based systems could reinvent the way business is done.

Rather than gradually phasing out papers and analogue systems, the move was more transformational. The process has opened a gate to freedom from repetitive analogue processes and enabled more creativity and better services for the clients. With the new wireless system, the team can now work from almost anywhere in the premises. Every legacy system, including file storage, communications and design tools have been digitalised. With this, dwp's specialists based in the Melbourne studio can collaborate with the project teams in the Dubai studio. Engineers in Singapore can join in a briefing update delivered by an operator in Boston. With an online digital 3D model as a single source of data, everyone has access to one another and to all relevant information.

The main challenge was to transform the 30-year-old traditional office into a flexible workspace for modern designers. The existing entrance lobby was unappealing, so its angle was adjusted by 45 degrees to be directly visible from the lobby. In order to create a welcoming space, the entrance foyer was expanded, adjusted and rounded to soften the edges. Gone is the old traditional square office. The organic shape hides the air handling units (AHU). The walls covering the AHU room were made to flow organically, so much that this feature has become central in its own right. The rough concrete finish and the voluptuous lines are juxtaposed to refer to the original exposed pillars.



The expanded foyer and the open-plan office





Reception area with coffee service

### ADOPTING AN AGILE OFFICE PHILOSOPHY

The new open-plan office has spacious zones and the teams are no longer tied to their desks. Without a PC and a LAN cable, they can now work independently or in groups anywhere in the building. The informal reception area is designed to resemble a café, with a barista to welcome visitors with a cup of coffee. There is a large meeting room, two smaller meeting rooms, a townhall-like meeting area, a staff canteen and a pantry.

Digital transformation as integral part of the design is present in the form of clean desks and warm meeting spaces that allow collaborations among team members from all parts of the globe. Most of the furniture is free standing, movable and adjustable, specifically chosen to reflect the company's brand identity that adopts an agile office philosophy. Storage is used without sacrificing aesthetics and space. The meeting room has a faux-wall to hide office accoutrement. Because personal desk drawers were removed, lockers were fixed into the hallway for staff to store their personal belongings.

### CREATING FLEXIBILITY AND COMFORT

The open-plan office was designed for dwp staff to be creative and interactive. The social areas are popular among the teams and meetings can be held in every corner of the office. There is a thick wooden counter that makes a functional and aesthetic workspace in the café area. There are small desks in the pantry that can be used for internal meetings or for casual catch-ups with suppliers.

Natural light from the treelined outdoors flows in,

reducing reliance on mechanical lighting and thus energy consumption. The floors are covered with carpets to absorb noise. Existing low ceilings were removed to create a sense of height and space. The social areas, meeting rooms and waiting areas are all located in the centre to allow for intimacy and flow. A zoning system separates the working area from the social area, with the latter receiving the most natural light from the windows to invite people to discuss and collaborate. Overall, the unity of the open-plan office has created greater communication and social cohesion. The spacious meeting rooms, equipped with modern technology, have also made dwp's clients keen to hold meetings in the new office.

### PLAYING WITH COLOURS AND MATERIALITY

The style of the dwp office is marked by the organic flow and rounded walls, juxtaposed with the rough concrete finishes. Exposed pipes and original markings on the beams were retained to become part of the artwork. The office also showcases dwp's clever combinations of materials and colours. The social areas are warm and welcoming with laminated floors. The open office is more dynamic with black tonal carpets that contrast with the white walls and the concrete pillars.

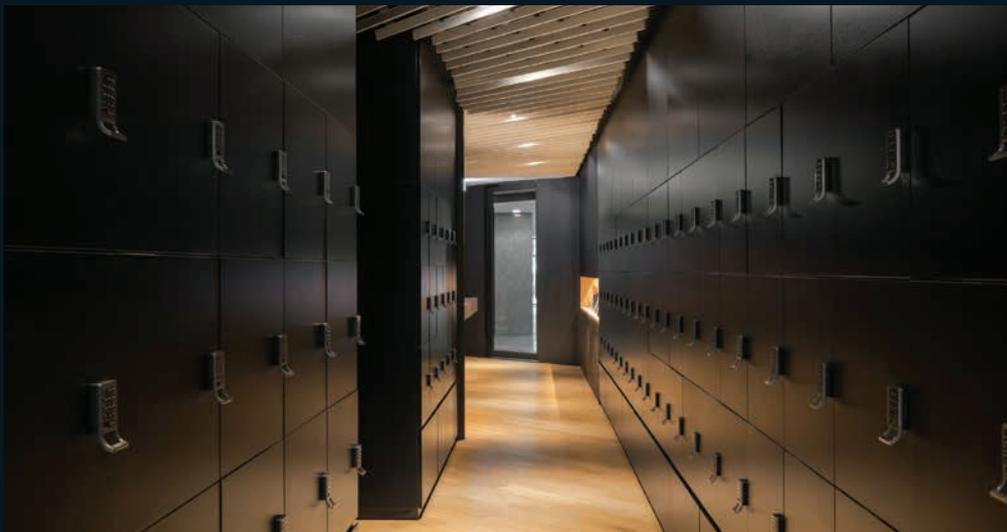
There are three styles of meeting room. The boardroom dedicated for big groups is clean and simple with white and grey tones. Banquette seats lining up the walls are available for even larger groups. The second meeting room is more colourful; and the third, used mainly for internal meetings, is more casual. 



The design highlights round and soft edges



One of the colorful meeting rooms



Lockers for staff to store personal belongings to replace the use of desk drawers

#### PROJECT DATA

**Project names**

dwp Office

**Location**

Bangkok, Thailand

**Completion Date**

October 2018

**Site Area**

1,245 square metres

**Building Height**

1 storey

**Number of Unit**

1 unit

**Client**

dwp

**Interior Design Firm**

dwp

**Principal Designer**

dwp

**Mechanical & Electrical**

**Engineer**

WEP Engineering Partners

Co Ltd

**Main Contractor**

Cre-Ful Co Ltd;

VTEC Decor Co Ltd

**Interior Fit-Out Contractor**

Cre-Ful Co Ltd;

VTEC Decor Co Ltd

**Images**

Penthai na Pombejra



Grand lobby with marble flooring and ornamented ceiling



## EASTIN HOTEL HANOI

The Eastin Hotel Hanoi is conceptualised as a city resort hotel in the middle of the buzzing city centre. The interior design relies on natural landscapes captured in photography and artworks and Vietnamese traditional culture. The concept design seeks to provide both comfort and luxury for the visitors who come either for business or leisure. The large public spaces will be divided into areas with different seating styles, sofas, sofa sets, double tables and other arrangements that cater customers' different needs.

### INCORPORATING TRADITIONAL CULTURE

Paintings of ocean waves and terraced fields will be placed in the lobby and corridors, alongside carpets with similar patterns. The lamps and the decorations will also be detailed with pictures of the sky, waves, stone textures and vegetation. Such highlights of natural elements will be coupled with Vietnamese traditional culture, such as the hand-woven rattan and bamboo ornaments that will be fixed to the walls and ceilings to create an ethnic accent.



The colour combination that emulates natural landscapes

Inspired by the nature of the Northern villages, the main colour tone for the condotel and the hotel rooms is brown gold. Traditionally-styled pendants in bold colours will leave a strong impression as customers enter the space. The use of carpets for the floor will make the room look exquisite.

#### ENSURING FUNCTIONALITY

The wooden furniture will be detailed with copper metal bracelets and designed to ensure that its practicality is in accordance with international hotel standards. Noise cancellation will be installed in the rooms to maximise comfort. The building orientation will also be arranged in a way that allows for natural light to flow in. The overall harmony between elegant material, artistic touch and standard design should deliver the hotel's aim to provide luxury and comfort.

In the dining area, the surfaces must be durable for heavy usage

with minimum maintenance. Thus, stone and homogenous tiles are the most suitable option for flooring. The dining area will use a combination of concrete, wood and carpets to achieve the desired look and ambience while maintaining the operational practicality.

#### RETAINING NATURAL CHARACTERS

The finishing material for flooring is marble with its retained natural characters. The tiles will be placed in a 30-degree angle to create the impression of natural mountain stone layers. The marble's natural golden-brown colours will cover the lobby and its smaller functionalities such as the waiting area, the reception, the bar, the coffee corner, the Internet desk and the spiral staircases. In other parts of the building, the golden tone will be mixed with Prussian blue, creating a trendy combination of colours that not only resembles nature but also highlights Asia's wealth of natural materials. 



Living room



Restaurant



Bathroom

## PROJECT DATA

### Project names

Eastin Hotel Hanoi

### Location

21 Duy Tan, Cau Giay,  
Hanoi, Vietnam

### Status of Construction

Under construction

### Expected Completion

April 2020

### Site Area

3050 square metres

### Gross Floor Area

26.500 square metres

### Building Height

26 storeys and  
3 basements; 91.8 metres

### Number of Rooms

196

### Client

Thang Long Ford JSC

### Architecture Firm

CPG

### Interior Design Firm

Baumschlager Eberle

### Principal Designer

Tran Quang Trung

### Lighting Consultant

Baumschlager Eberle

### Landscape Architect

Baumschlager Eberle

### Images

Baumschlager Eberle

# MALAYSIA

## STONYHURST INTERNATIONAL SCHOOL, PENANG



PROJECT TITLE	PROJECT TYPE	LOCATION	DEVELOPER	ARCHITECT/ CONSULTANT	CONSTRUCTION START	ESTIMATED PROJECT VALUE (RM 'MILLION)
Kota Kemuning RP 10	Residential	Kota Kemuning, Shah Alam	HICOM Gamuda Development	ARC Partnership & ARCAliance	Q1 2020	60
Rumah Selangor Ku (PT 73321 & 73322)	Residential	Kapar, Klang	NPO Land	DMP Architects	Q1 2020	15.50
Sejati Residences Cyberjaya (Phase 4)	Residential	Cyberjaya, Dengkil, Selangor	Paramount Property Cyberjaya	SA Architects Sdn. Bhd	Q1 2020	50
Taman Semarak Megah (Phase 8)	Residential	Tawau, Sabah	Suhima Sdn Bhd	Arkitek LYS	Q1 2020	8
Stonyhurst International School Penang	Educational	Tanjung Pinang, Penang	Lasallian Asia Partnership for International Schools (LAPIS)	VERITAS Architects Sdn Bhd	Q1 2020	61
The Conlay	Residential	Jalan Kia Peng / Jalan Conlay, KLCC	Patsawan Properties	Kerry Hill Architects / GDP Architects	Q1 2020	300
Langkawi City Shop Offices (Phase 4)	Commercial	Kuah, Langkawi	PFCE Integrated Plant & Project Sdn Bhd	Walter & Jo Architect Associates	Q1 2020	3.70
Dalat International School (Phase 2)	Educational	Tanjung Bungah, Penang	Dalat International School	CK Goh Architect	Q1 2020	2
Alam Pesona Putatan	Residential	Kampung Gambalon, Putatan	WK Consortium	Daniel Yap Architect	Q1 2020	175
Wisma Aman Elite	Mixed Use	Jalan Desa Aman 1, Cheras	CL Elite Developer Sdn Bhd	Perunding Alam Bina Sdn Bhd	Q1 2020	50
Bangunan Gunasama Persekutuan Kota Bharu	Institutional	Tunjong, Kelantan	Jabatan Kerja Raya Malaysia - Cawangan Kerja Bangunan Am 1	Mulhaf Amrose Architect	Q1 2020	450
Sungai Buloh Vocational College	Educational	Jalan Kuala Selangor, Sungai Buloh	Kementerian Pendidikan Malaysia (Ministry of Education)	Imaar Architect Sdn Bhd	Q1 2020	20

Source: BCI Asia Research

# SINGAPORE

## TAMPINES GREENSPRING



PROJECT TITLE	PROJECT TYPE	LOCATION	DEVELOPER	ARCHITECT/ CONSULTANT	CONSTRUCTION START	ESTIMATED PROJECT VALUE (SGD 'MILLION)
Sky Everton	Residential	Everton Road	Sustained Land Pte Ltd	ADDP Architects LLP	Q1 2020	75
Gongshang Primary & Jurong Primary & Former East View (Phase 4D)	Educational	320 Jurong East Street 32 / 1 Tampines Street 42 / 3 Tampines Street 42,	Ministry of Education	CPG Consultants Pte Ltd	Q1 2020	36
Punggol Recreation & Sports Centre (PRSC)	Recreational	Punggol Drive / Sentul Crescent	Singapore Sports Council	DP Architects Pte Ltd	Q1 2020	306.62
Jurong Regional Line (JRL) Contract J102	Transportation	Choa Chu Kang Station JS1   Choa Chu Kang West Station JS2   Tengah Station JS3	Land Transport Authority (LTA)	Atkins Design & Surbana Jurong Consultants	Q1 2020	465.17
Jurong Regional Line (JRL) Contract J103	Transportation	Hong Kah Station (JS4) & Corporation Station (JS5)	Land Transport Authority (LTA)	DP Architects Pte Ltd, Hassell Architecture (Singapore) & Surbana Jurong	Q1 2020	274.30
Jurong Region Line (JRL)   Tengah Depot	Transportation	Tengah   Kranji Expressway   Pan Island Expressway   Tengah New Town	Land Transport Authority (LTA)	ONG&ONG Pte Ltd	Q1 2020	739.52
Tuas South Link 2 - Plot 6 Factory	Industrial	14A Tuas South Link 2	Wellbuilt Pte Ltd	ID Architects Pte Ltd	Q1 2020	5.98
Tampines GreenGlen	Residential	Tampines North Drive 1   Tampines Street 64	Housing & Development Board (HDB)	HDB Building Research Institute	Q1 2020	59.45
Tampines GreenSpring	Residential	Tampines Walk / Tampines Avenue 5	Housing & Development Board (HDB)	Surbana Jurong	Q1 2020	98.73
Tengah Garden Common Green	Recreational	Tengah Garden   Bukit Batok Road	Housing & Development Board (HDB)	Surbana Jurong	Q1 2020	157.60
Tengah Garden Car Park	Infrastructure	Tengah Garden   Bukit Batok Road	Housing & Development Board (HDB)	Surbana Jurong	Q1 2020	134.44
Garden Vines @ Tengah	Residential	Tengah Drive   Tengah Garden Walk   Plantation Crescent	Housing & Development Board (HDB)	Surbana Jurong	Q1 2020	165.80

Source: BCI Asia Research



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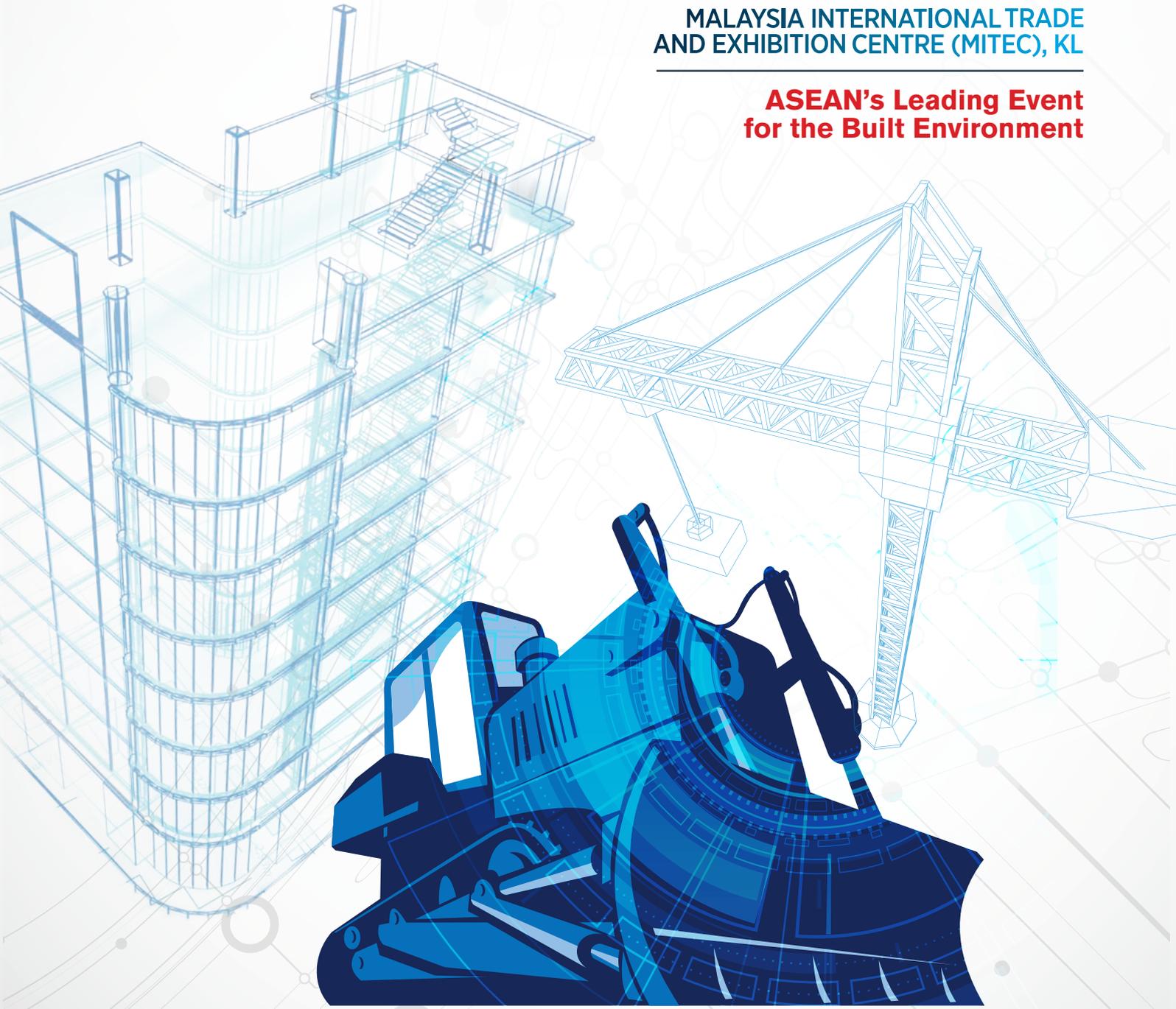
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# HOMETEAMNS' BEDOK CLUBHOUSE

HomeTeamNS' Bedok Clubhouse is a four-storey clubhouse fronting Bedok Reservoir. Slated to start operations in 2021, the clubhouse will have recreational and educational facilities for all ages; and will also be equipped with the latest technology to ensure the occupant comfort as well as energy efficiency so that carbon footprint will be minimised. The clubhouse will be fenceless and connected to Bedok Reservoir Park. Designed to achieve Green Mark Platinum certification, it will also have solar panels, ventilated spaces and rainwater harvesting.

## PROTECTING THE ENVIRONMENT

A series of detailed screens will envelop the building façade on all sides to reduce solar heat gain, hence minimising air-conditioning. The dynamic design will create a sense of movement and fluidity. A biophilic curved planter will blend the building into the surrounding park setting

The clubhouse will also include 10 villas and an indoor waterslide. The crossing of services from the main clubhouse to the

indoor waterslide and villas is obstructed by the existing main water pipes. Two crossover bridges are designed as part of the development to solve this issue. To ensure proper protection of the main water pipes, the design planning of the development is divided into three parts and each is delivered with great care.

The clubhouse, indoor water park, and villas are designed in such a way that it takes advantage of the existing terrain, minimising the need for cut and fill. Some of the villas are on stilts and located on the hill slope. Certified arborists and other professionals are employed in the design and implementation phase to conserve major forested areas on the site and to ensure proper protection of the ecology.

## EXTENSIVE RECREATIONAL FACILITIES

Terraces on the second floor of the clubhouse offer not only comfortable spots for relaxing but also a picturesque view of the forested area. Greenery placed in the terraces complements the landscaping of the curved planter. The villas will have a sheltered



Pool deck



Villa with a sheltered terrace



Park connector

terrace and tall mullioned windows, similar to those of a holiday resort, which will have extensive landscaping that blends with the surrounding area.

Besides housing a giant indoor waterslide with LED lights and an obstacle rope course, the clubhouse will also feature various other facilities. Footpaths will also be built around the area to connect spaces. Overall, the clubhouse is designed to create a shared environment for the residents to foster social relations. 📍

#### PROJECT DATA

**Project Name**  
HomeTeamNS' Bedok Clubhouse

**Location**  
Lot 7547X Mukim 28, Bedok North Road, Singapore

**Status of Construction**  
In progress

**Expected Completion**  
2021

**Site Area**  
20,000 square metres

**Gross Floor Area**  
14,700 square metres

**Building Height**  
4 storeys

**Developer**  
HomeTeamNS

**Project Management Consultant**  
SIPM Consultants  
(a member of Surbana Jurong)

**Architecture Firm**  
Surbana Jurong Consultants

**Interior Design Firm**  
Surbana Jurong Consultants;  
Space Matrix

**Civil & Structural Engineer**  
Surbana Jurong Consultants

**MEP Engineer**  
Surbana Jurong Consultants

**Quantity Surveyor**  
Surbana Jurong Consultants

**Landscape Architect**  
Surbana Jurong Consultants

**Foundation & Piling**  
CS Bored Pile System

**Main Contractor**  
CMC Construction

**Images**  
Surbana Jurong



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**Aerial Bundled XLPE & PE Cables**  
1kV, 11kV, 22kV, 33kV



**Underground Medium Voltage XLPE Cables**  
11kV, 22kV, 33kV  
1-core, 3-cores



**Underground Medium Voltage XLPE Cables**  
11kV, 22kV, 33kV  
1-core, 3-cores



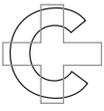
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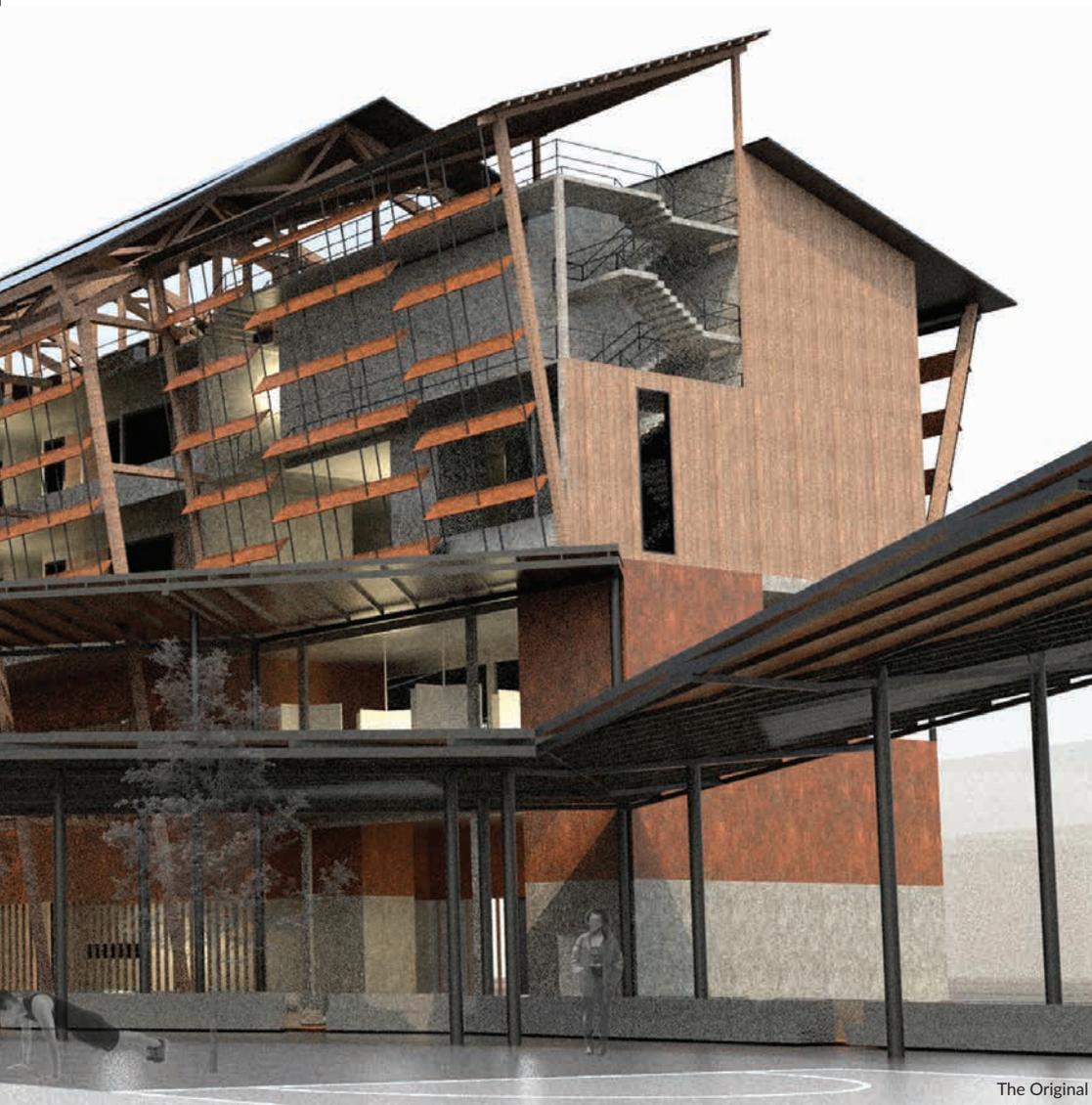
## STUDENT FEATURE

Life can be challenging for former convicts, especially when they try to re-enter society. However, correctional facilities provide only minimum reintegration preparation and assistance, most probably due to limited federal budget. The following projects focus on the role of architecture and support programmes to aid former convicts to go through the process more successfully. The target is to build a facility that provides a stable home and community engagement that will hopefully lead to steady employment and a fulfilling life.

To help alleviate reintegration challenges, this project has asked the students to include a living space that emphasises on social elements. Art is central and appears as both an installation that becomes a medium of social interactions, and as part of the design itself. Besides this commonality, the three designs listed below are also designed by students from the same school and supervised by the same lecturer.



De Fussee



The Original

## PROJECT DATA

### Instructor

Assistant Professor Ar. Chia  
Lin Lin

### School

UCSI University, Kuala Lumpur

### Programme

Bachelor of Architecture

### Project Year

July 2018

### Location

SS2, Petaling Jaya, Selangor

### Site Area

14,820 square metres

### Gross Floor Area

4,500 square metres

### Building Height

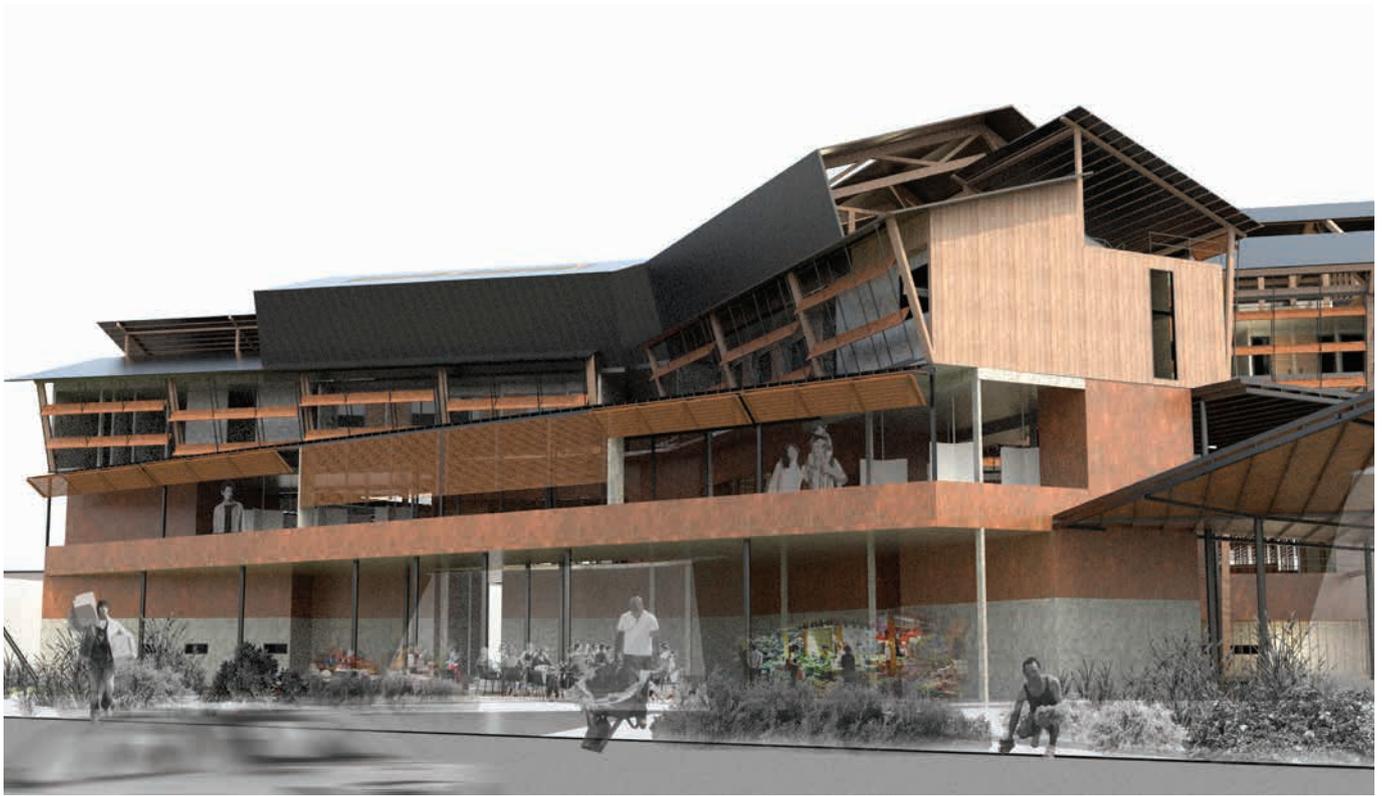
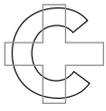
5 storeys

### Implementing Agency

Majlis Bandaraya Petaling Jaya



Nod Maxin



The rustic ambience

# THE ORIGINAL

BY DAMIEN TAN KOK POH

The Original means that the context remains intact despite the introduction of a new building. The landmark in the area includes the well-known steel material store that contributes to the overall rustic ambience. The Original is designed to blend in with the surroundings, so the materials chosen are steel, concrete and wood.

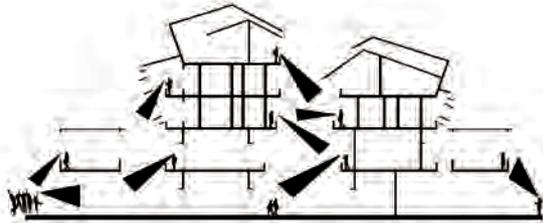
The building is connected visually at all levels thanks to the use of wooden latticework. Natural light shines through such an open design. Wooden panels that shape the façade serve as a shading element as well. Inside, the spaces are configured to encourage interactions among dwellers. For example, to reach the communal kitchen, one needs to go through public spaces on the second and third floors.

Besides socialisation, the Original also facilitates learning. The public areas can be utilised to conduct practical training such as food packaging training to meet the demands of nearby catering industries. Pivot doors help provide direct access from one space to another.

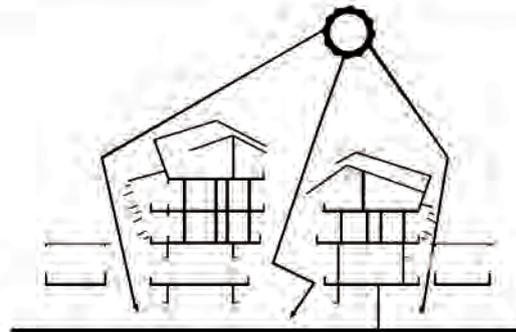


Space for morning market on the ground floor

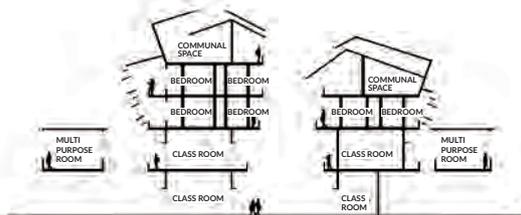
**THE ATRIUM** THROUGH THE HEART OF THE BUILDING THAT VISUALLY CONNECTS ALL LEVEL. IT'S **IMPROVING THE CONNECTION** TO THE SURROUNDING COMMUNITY.



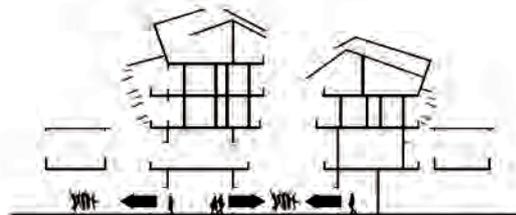
**THE NATURAL LIGHT** THAT ABLE TO INCREASE HUMAN INTERACTION AT COMMUNAL SPACE. THE BENEFICIAL OF GOOD LIGHTING DESIGN CAN EFFECT ON **PHYSICAL AND MENTAL REHABILITATION OF HUMAN**.



**THE INDIVIDUAL ROOMS** ON THE TWO MIDDLE FLOORS. EVERYONE HAS TO PASS THROUGH THESE SPACES IN ORDER TO REACH THE COMMUNAL KITCHEN. IT'S **ENCOURAGE THE EX-PRISONER TO COMMUNICATION** TOWARD THE SURROUNDING COMMUNITY.



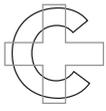
THE OCCUPANT OS ABLE **DIRECT ACCESS** BY USING PIVOT DOOR FROM A SPACE TO PUBLIC ACTIVITY PROGRAM. SO THAT CAN ARCHIVE **BETTER LEARNING ENVIRONMENT**.



The visually connected design



Outdoor training area



# DE FUSSEE

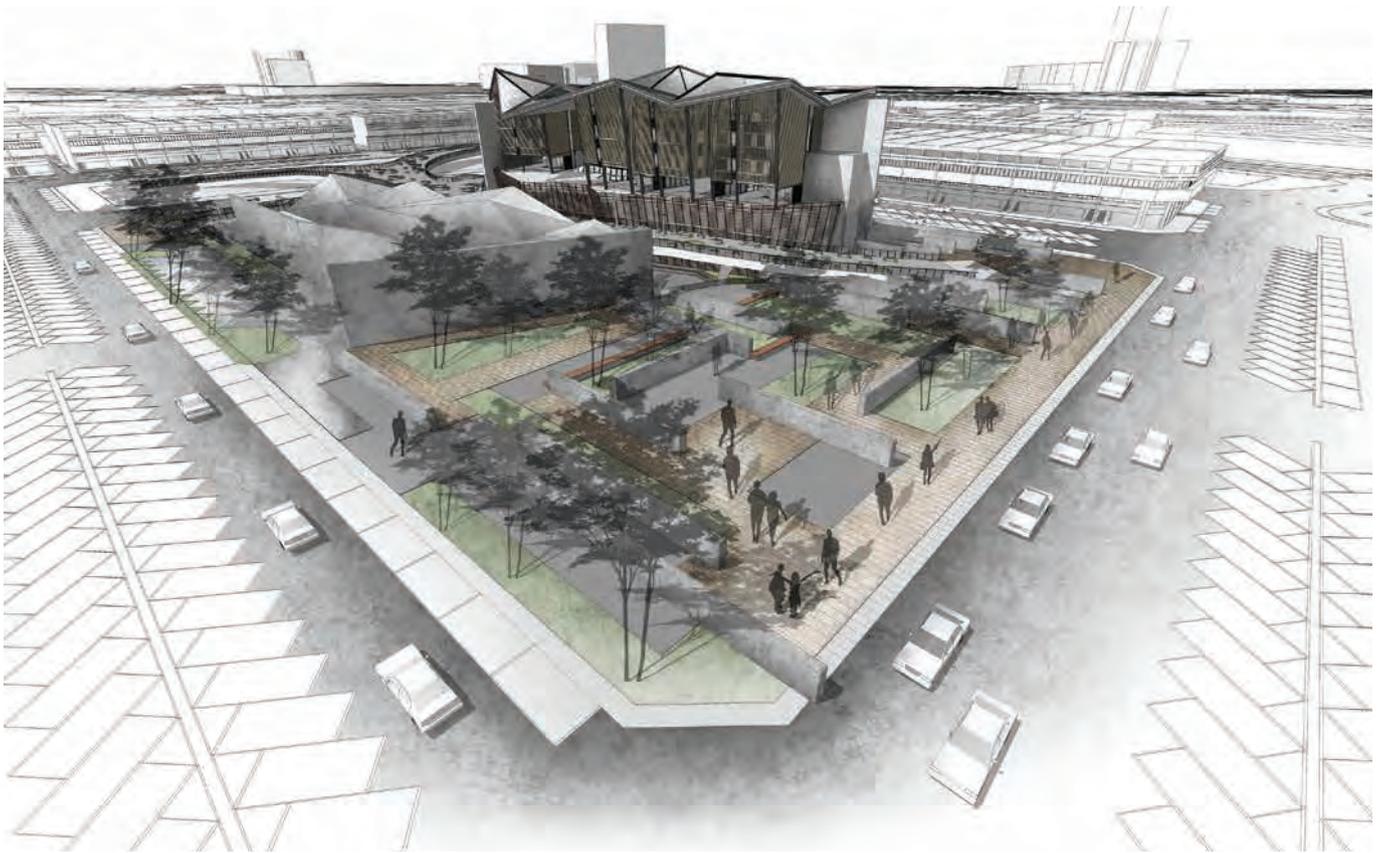
BY ALEXANDER NG

**D**e Fusee is from the word diffuse—to spread over a wide area—which implies the project aims to help former convicts re-enter society. The idea of acceptance is reflected through the irregularity of the building forms and the configuration of the diverse elements. This is to state that all members of community can live together regardless their social backgrounds.

Irregular geometry appears on the façade and in the interior. Definitive angles are formed by walls, roofs and decorative elements to define spaces and enhance aesthetics. Slanted wooden laticework is installed to partition the spaces without

blocking the view, which also creates a striking floor-to-ceiling quadrilateral and a shadow play when sunlight shines through. Tropical plants dotted around the area balance out the strong architecture. There is a footbridge to connect the surroundings with the building's assembly where art installation is displayed.

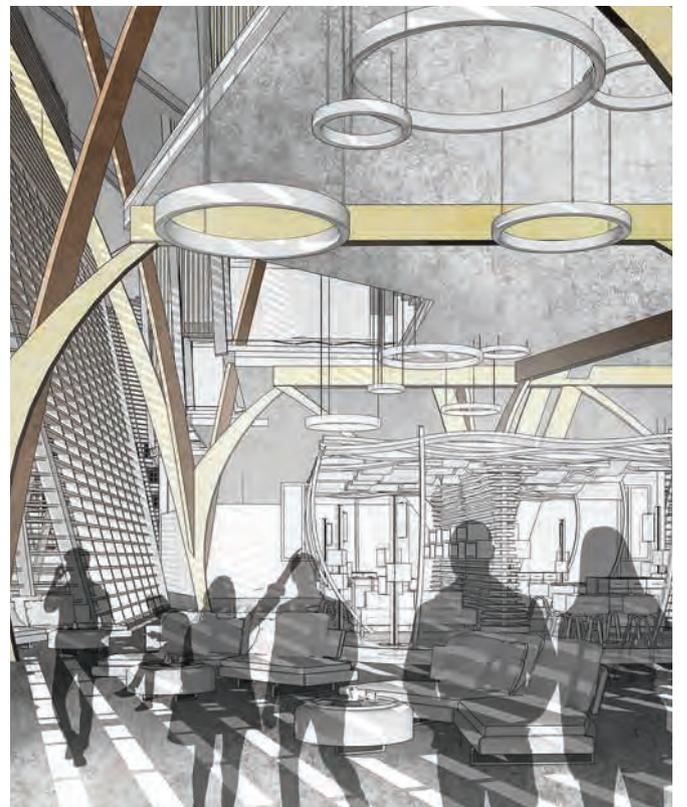
The building mainly consists of a combination of laminated timber and raw concrete. The use of these materials is to create a calm and neutral public space. Moreover, timber and concrete are believed to have the quality to blend art into the space without overshadowing the aesthetics of the artwork itself.



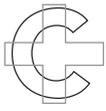
The building is linked to the nearby parks



The shadow play created by the wooden latticework



The configuration of the diverse elements



Angular patterns on the facade

# NOD MAXIN

BY AZHAR ALI MOHAMED TAJUDEEN

Nod Maxin draws its idea from restorative justice that bridges offenders, victims and representatives of the wider community. The concept is connectedness, which seeks to create a healthy ecology consisting of people, buildings and the environment. The human-centred design also aims to bring new dynamics that reinvigorates the existing urban fabric.

The main materials are glass, concrete, timber and cladding, which are procured locally. The façade is made of glass to build a sense of connectedness, with angular patterns to create irregular shadows in the interior.

Apart from the art gallery, communal space is available in the outbreak area. Hardscape elements are not only a part of the aesthetics, but also serve as a seating area. Chairs and benches are arranged in a way that people can gather and mingle. This public space is also designed to hold events that encourage interactions. With an open common space, boundaries between former convicts and other members of community are expected to blur. 📍



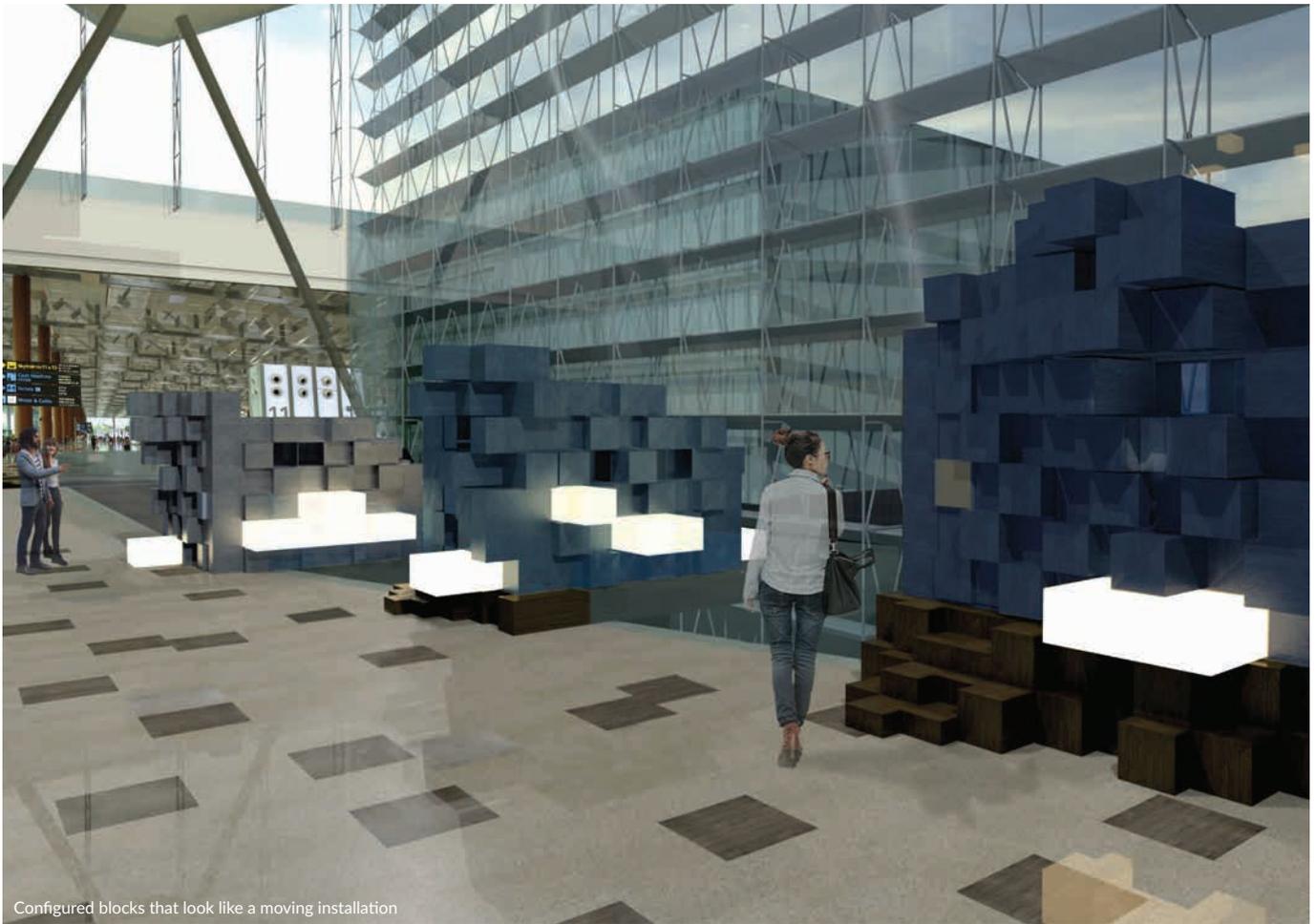
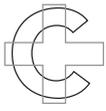
The outbreak area



Building connector



The art gallery



Configured blocks that look like a moving installation

## OUT OF SIGHT

**O**ut of Sight is a rest area for staff in Changi Airport Terminal 3, tucked away between the escalator and lift that leads to the MRT/Terminal 2. The amenity utilizes the voids in the area and takes the form of pods—three of them are elevated in the void next to elevator and two are located in front of the lift adjacent to each other. This space is designed to facilitate physical and mental rest, allowing users to detach completely from the crowd. At the same time, this should be disguised as an installation that adds dynamics to the dead spot.

### UTILISING THE VOIDS

Prior to the design phase, research was carried out to determine the concept. The staff at Changi Airport needed a rest area hidden from the public and suitable for large groups. Based on the site observation, the area between the lift and the escalator is the most suitable because it does not have a lot of foot traffic and there are voids.

The pods are made up of movable rectangular blocks in different lengths that users can reconfigure accordingly to cater to their needs. Users can push or pull the functional blocks to transform them into a bench or bed, a table and seats, or a high table. This brings about movement to the pods, making them look like a moving installation. The activities inside the pods are hidden from public view.

### MATERIAL AND COLOUR

The interior uses artificial grass carpet to cover the stone floor. Full height glass cladding covers each side of the pods. These materials make the space look hard and cold, so timber is used for the blocks to soften the impression. Some of the blocks are equipped with lights. The material for these blocks is moulded-to-shape acrylic, with dimmable LED lights within. To increase the aesthetic level, the exterior walls are stained in two colours; from one side the pods' colours are different shades of red, while the other sides show different shades of blue. 

**PROJECT DATA**

**Student Name**

Emilia Lee

**Instructor**

Sharmila Kanagalingam

**School**

Singapore Polytechnic  
Design School

**Programme**

Interior Design Studio

**Project Name**

Out of Sight

**Project Year**

2017

**Location**

Changi Airport Terminal 3,  
Singapore

**Site Area**

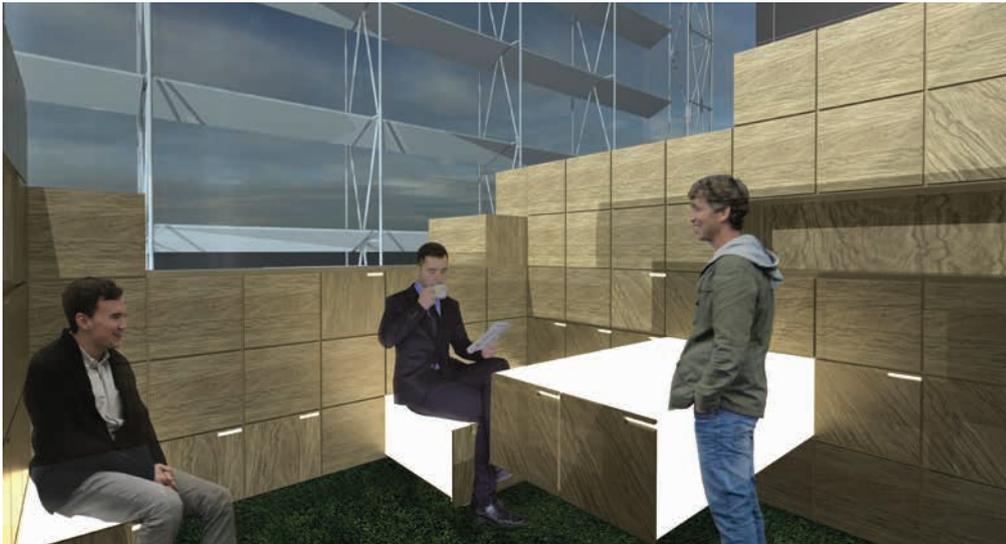
200 square metres

**Images**

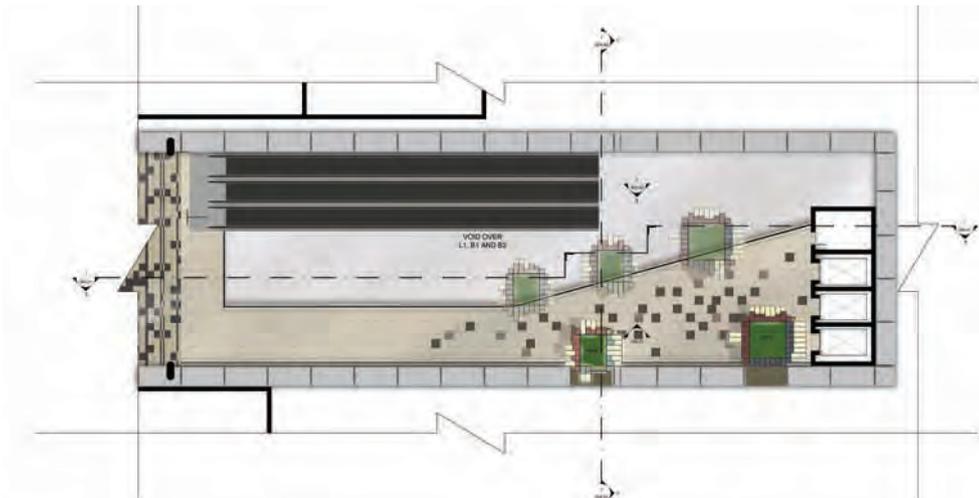
Singapore Polytechnic  
Design School



Utilising voids



Users can transform the blocks into a table or a chair



Site plan



# *The Aesthetics in Details*



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landscape & lighting

# Trim *design*

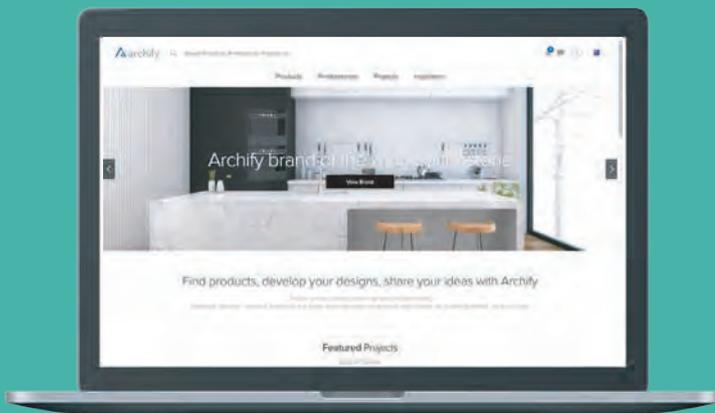


Design by Maxine Chau



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