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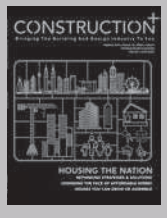

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Asia has experienced rapid urbanisation over the past decades, and thanks to this trend, the region's economic growth has been predicted to continue.

However, with urbanisation comes a wide range of challenges, from traffic congestion and affordable housing shortage to air pollution and urban sprawl. If these challenges are not mitigated in time, congestion and overcrowding may overwhelm the benefits of urban agglomeration and become a threat to sustainability.

Although Singapore is known for its sustainable urban planning practices, it is not free from these challenges. The government's Population White Paper drew much controversy when released in 2013 due to its population expansion policy, amid concerns of insufficient infrastructure and affordable housing. Singapore has also experienced deterioration in air quality over the past few years.

We, as experts of the built environment, should take these problems seriously and eagerly find solutions to tackle them. Urban planners and designers need to understand root causes of urban problems and draw lessons from other cities to improve domestic practices. Professionals in the fields of architecture and construction will be able to contribute a lot by adopting innovative building designs and technologies.

As a long-time researcher in urban planning, I strongly believe in the value of translating research outcomes into some practical and industrial applications that could directly impact the built environment. Unfortunately, I have observed that academia and industry collaboration is often lacking, even in Singapore despite many government initiatives.

I hope *Construction+* will continue to provide an active platform to connect industry professionals with scholarly researchers across Asia to enable cross-fertilising potential on relevant and important topics, such as this issue's focus on affordable housing.

LEE KWAN OK
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Dear readers,

Late last year, I checked off a bucket list item when I helped to build two houses for *orang asli* families under EPIC Homes. Seeing the entire structure come together and handing over the completed homes to the families in just three days was an exhilarating experience. It gave me a greater appreciation for the hard labour that takes place every day at construction sites. I was also inspired to hear founder John-son Oei share EPIC Homes' vision and plans to level up to better meet the needs of the indigenous people in Malaysia. Read our interview with him on page 46.

Making quality housing accessible to all is a perennial problem with no easy solution. While the Singapore government has led the way to achieve a nation of homeowners, housing affordability in a land-scarce country is still a big concern among the younger generation, particularly the 'sandwiched' class.

In Malaysia, there is currently a lot of focus on the B40 population, with the newly released National Housing Policy (2018–2025). Will the strategies and action plans be implemented effectively enough to give targeted solutions for localised needs or will it end up being the same ol' generic story? Our commentators lend their insights and perspectives on these matters and more.

Perhaps the answer to cheaper, better housing lies in the use of technology. In this issue of *Construction+*, we also take a closer look at digital design and prefabrication and how these are changing the way homes are being built.

We hope you enjoy the read and let us know what else you would like us to feature in our coming issues.

Joanna Sze
Senior Editor

Singapore's public housing authority has directly provided homes for more than 80 per cent of its resident population

AFFORDABLE HOUSING: THE SINGAPORE STORY

How a dual-pronged public–private approach has helped create a nation of homeowners

BY LEE KWAN OK

Over the past decades, we have observed the dramatic escalation of house prices in many cities around the world. What is more serious is that house prices have risen faster than household incomes in some of these cities.

According to Demographia International Housing Affordability Survey, the median multiple—the measurement of housing affordability by linking median house prices to median household incomes—has significantly increased in popular global cities, including Hong Kong, Sydney and London, between 2013 and 2017.

As a result, growing numbers of low- and middle-income residents in these cities have had to pay a higher share of their income for their rental and purchased housing, and in turn, reduce non-housing consumption and compromise their well-being.

Hence, alleviating housing affordability stress is one of the most important public concerns.

Different countries have adopted diverse approaches to make housing more affordable, ranging from supply-side housing programmes, such as public housing, to demand-side housing grants and rental vouchers.

Housing researchers suggest that four dimensions are useful in analysing and evaluating these approaches, including:

- Supply: whether the supply of affordable housing is adequate to meet the demand
- Equity: whether housing assistance is lacking for certain groups of households
- Cost: whether the government can afford its affordable housing programmes
- Quality: whether the provided affordable housing offers acceptable conditions of living

What is obvious is that demand-side housing assistance cannot solely resolve housing affordability issues, especially in cities with tight supply constraints. Some argue that regulators should consider reforming the barriers to new construction by the private sector if they hope to lower housing prices.

From an opposite perspective, the government's direct provision of affordable housing could increase the stock of affordable housing. However, some countries have struggled with using such public housing schemes, given limited land availability and falling government revenues.

In the US context, federal public housing programmes targeting low-income households have often been associated

Cities	Median Multiple in 2013	Median Multiple in 2017
Hong Kong, China	14.9	19.4
Sydney, Australia	9.0	12.9
Vancouver, Canada	10.3	12.6
Santa Cruz, US	9.0	10.4
Auckland, NZ	8.0	8.8
London, UK	7.3	8.5
Tokyo-Yokohama, Japan	4.4	4.8
Singapore, Singapore	5.1	4.8

House prices have risen faster than household incomes in many major cities

with many negative outcomes, such as the isolation of these households in poorer, minority-concentrated neighbourhoods, as well as racial segregation at the aggregate level.

Over in Iskandar Malaysia, while all private developers of new residential projects are mandated to build 30 per cent of affordable homes, this percentage is sliced to 10 per cent if the developer's project is located within the Special Economic Zone, and these affordable homes are allowed to be built away from their high-end residential projects. As a result, some affordable housing projects have been built in isolated and undesired locations.

HDB AND BEYOND

Singapore is one of the few countries that have successfully implemented public housing programmes. The Housing and Development Board (HDB), Singapore's public housing authority, has directly provided homes for more than 80 per cent of its resident population, with approximately 90 per cent of this population being homeowners. As a result, Singapore has maintained its median multiple at around 5, which is much lower than other global cities despite its fast economic growth.

The HDB's success is attributable to an innovative system that allows the mobilisation of pension fund savings for housing purchases, policy measures for ethnic integration, and effective property management.

The Singapore government has also put in a lot of effort to ensure equitable affordability for all households with different income levels.

On one hand, demand-side housing grants have been calibrated based on multiple criteria for more equitable and targeted housing outcomes. For example, while higher housing grants are provided to first-time and lower-income buyers who purchase smaller flats, a Proximity Housing Grant (PHG) was set up in 2015 for households purchasing a resale flat located close to their parents or children.

On the other hand, attention has been given to the middle-income families who cannot afford to buy their own home in the private housing market, but are disqualified from receiving housing assistance from HDB due to their slightly higher income level. The Executive Condominium (EC) scheme was introduced in 1995 as a new solution to enhance housing affordability for these so-called 'sandwiched' class of citizens in Singapore. While buyers of the first-hand EC units enjoy lower prices than comparable, new private condominium units, they cannot rent or sell these units within the first five years. These units can be sold after the fifth year only to Singaporeans and become fully privatised after the 10th year.

The EC scheme was envisioned as a form of subsidised housing that is

developed, priced and sold by private developers, and features gated communities and common facilities, such as swimming pool, gym, tennis courts and clubhouse. Unlike HDBs, where the private sector is engaged as a vendor and the government is solely responsible for financing, developers are given more freedom and bear most of the development costs and risks for EC projects.

Developers are likely to bid less for EC-designated land parcels compared with for similar land parcels designated for private condominiums. This may mean less revenue from land sales, but the foregone revenue for the government would be a lot less compared to the entire development cost and demand-side subsidies for HDB supply, which has resulted in annual deficits for the HDB of up to SGD2 billion.

In fact, mainly due to cost issues and other criticisms that the Singapore government has faced, the recent trend for affordable housing policies has been the provision of less direct housing, as practiced in other countries, such as the US and Australia. For instance, many US cities have relied on affordable housing supply from the private sector through the inclusionary zoning programme, which requires private developers to set aside a certain share of their new residential projects for affordable rental or for-sale units, as well as the low-income housing tax credit programme, which offers tax credits for costs incurred in developing or rehabilitating low-income units in rental housing developments.

One critical question is whether high quality and long-term affordability can be guaranteed for affordable housing projects provided by private developers.

Quality should be a priority in the construction of affordable housing

Singapore has adopted a complementary approach between its existing, strong commitment to public housing provisions and the expansion of the private sector's role in affordable housing supply.

CONTINUED CHALLENGES

One critical question is whether high quality and long-term affordability can be guaranteed for affordable housing projects provided by private developers.

In Singapore, the Design, Build and Sell Scheme (DBSS), where private developers build and sell HDB flats directly to buyers, has been suspended due to issues related with pricing and quality. For example, a five-room DBSS flat at Centrale 8 in Tampines has been sold for SGD880,000, which is an unprecedentedly high price tag for new HDB flats. Furthermore, some DBSS projects, such as Pasir Ris One and Trivelis, have been criticised for poor design and quality—such as narrow common corridors and shattered shower glass panels.

The Singapore government has since turned its efforts of involving the private sector to ECs. With the ECs, the private developer is solely responsible for design and quality, unlike the DBSS, which is still managed by HDB. This is related with the clear separation of responsibilities between the public and private sectors.

No doubt there are many advantages of involving the private sector in affordable housing provisions—such as saving taxpayers' financial burdens and tapping on additional resources and expertise of the private sector—but institutional frameworks should be improved and public benefits should be prioritised for more successful outcomes. In particular, contracts for the private sector involvement should clearly define rights and responsibilities of the public and private sectors.

Another hot issue is the upcoming lease expiry dates of first-generation

Solving affordable housing challenges requires multidimensional considerations of supply, equity, cost and quality.

HDBs. The Singapore government is clear that it will not exercise the automatic renewal of HDB leases, and not all HDB estates will go through redevelopment. This is to ensure the government will get the land back for its new supply of public housing for the next generations, which is related with long-term affordability of the nation.

And as the first-generation HDBs get older, there is a continued need to renovate and rebuild. HDB prices, especially resale prices, have increased significantly over time, along with the private housing markets. As a result, there are still many young adults who cannot afford units in their desired location or who belong to the 'sandwiched' class. This is why housing affordability is still an important issue in Singapore.

Solving affordable housing challenges requires multidimensional considerations of supply, equity, cost and quality. With the Singapore story, we find how such a holistic framework has played an important role to its success for affordable housing practices.

While the framework works within the unique contexts of Singapore, analyses of its continuing, multi-pronged approaches and implications drawn may be relevant to other global and globalising cities that face similar affordability concerns.

With rising HDB prices, housing affordability remains a key issue in Singapore

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Lee is also the deputy director of the MSc in Environmental Management (MEM) programme at NUS.

Her research interests include neighbourhood dynamics, household residential choice, real estate markets and urban policy analysis. Her research has appeared in leading academic journals, such as the American Economic Review: Papers & Proceedings, Journal of Urban Economics, Journal of Regional Science and Journal of Law and Economics.

She currently sits on the editorial boards of the International Journal of Urban Sciences and the Journal of Korea Planning Association. She also served as an international commentator for the Cityscape's volume on affordable housing programmes in the US, which was published by the Office of Policy Development and Research of the US Department of Housing and Urban Development.

Prior to joining NUS, Lee received her PhD in Policy, Planning, and Development from the University of Southern California and Master in Urban Planning from Harvard University.

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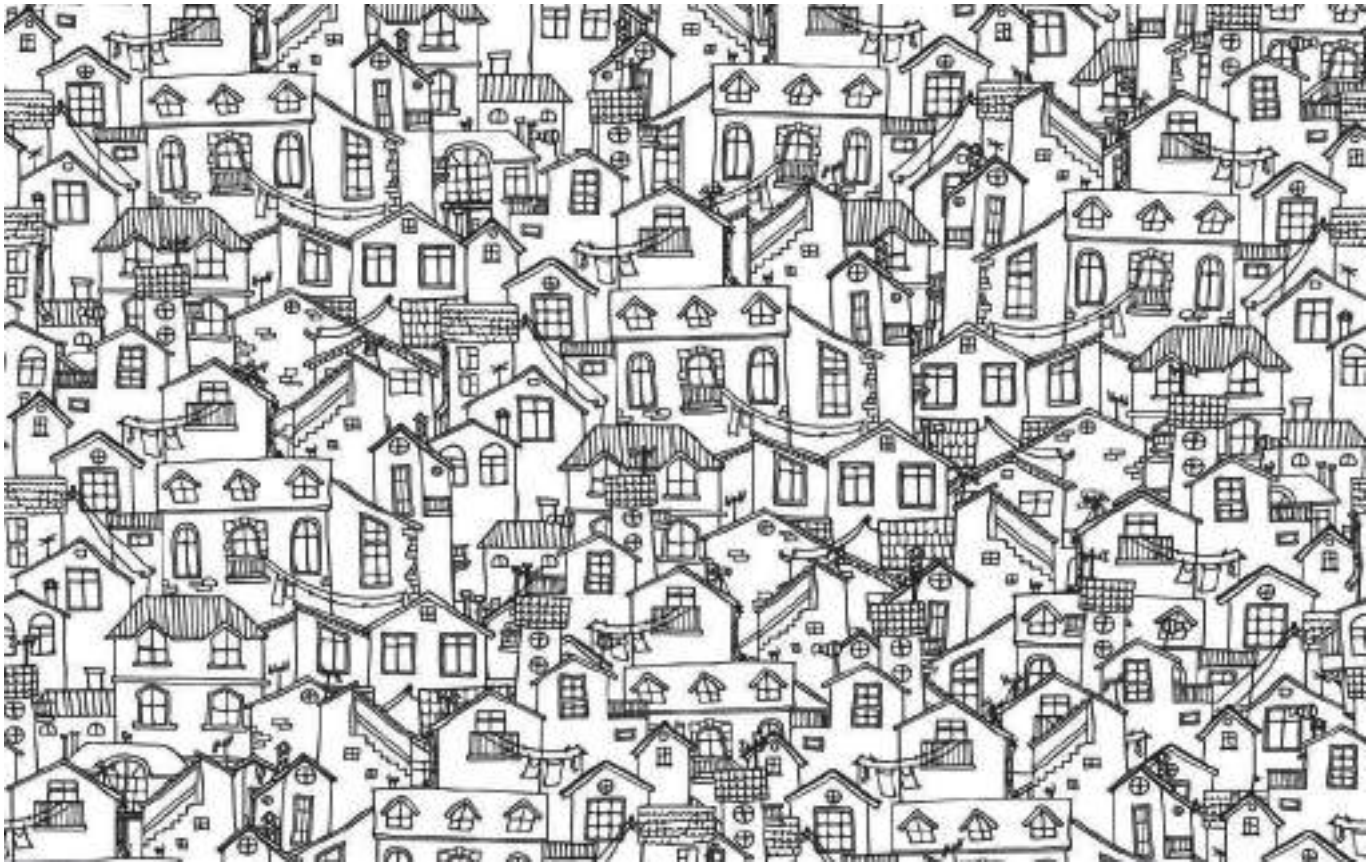


INFERNAL HOUSING AFFAIRS

'One solution fits all' will no longer work in solving the perpetual affordable housing conundrum

BY CHA-LY KOH

The physical shape and health of most cities across the world is as much affected by its geography as its politics.

Greater Kuala Lumpur is no exception. It has a political form in the shape of a sunny-side up egg, with a rich 'yolk' in the form of Kuala Lumpur, governed by the federal government, and an 'egg white' under the jurisdiction of the Selangor state government. Despite political boundaries, the city functions largely as a single organism with both parts co-dependent for survival.

After the 12th general election in 2008, the political boundaries were further intensified when the 'egg white' and 'yolk' ended up being governed by different ruling parties.

These governments have subsequently pursued opposing policies with various attempts in tackling the affordable housing issue. Let's examine some of these policies from over the past 10 years to see how effective they are.

PRICE CONTROLS

The Selangor state government adopted a price-control strategy beginning 2013. The policy made it mandatory for housing developers to price 20 to 50 per cent of all development units below RM250,000 as Rumah Selangorku housing.

Unfortunately, the fundamental business case for housing development is unable to accommodate this form of price controls. Housing developers launch developments only when their minimum gross development values (GDVs) are met to sustain their business case. If the policy dictates for half the housing stock to be launched under RM250,000, the price for remaining units will need to be inflated to meet the GDV targets.

When the inflated prices for the free market units are too high for absorption, property developers will then hold back on supply, which leads to an increase in overall housing prices. This is what happened to the Selangor housing market after the launch of this policy, when the number of new homes under construction plunged from 154,888 units in 2013 to 128,675 in 2014 (Figure 1). At the same time, there was an intense concentration of new housing supply on the Kuala Lumpur side of the border.

The proportion of new affordable housing supply in Selangor, priced under RM250,00, also continued its downward trend under this policy, from 31 per cent between 2010–2014 to 27 per cent between 2015–2019, while the proportion of housing priced between RM750,000 to RM1 million significantly increased due to the need to cross subsidise (Figure 2).

The government can invest in comprehensive urban redevelopment strategies to immediately deliver on quality housing, instead of focusing on building new units that would be abandoned and disposed in 20 years.

In short, the price-control strategy unintentionally resulted in constricted supply in both the overall market, as well as affordable housing units.

INCREASED SUPPLY

While Selangor tried to address prices, the then-federal government took on an opposing strategy by increasing the affordable housing supply through the doubling of development densities in Kuala Lumpur.

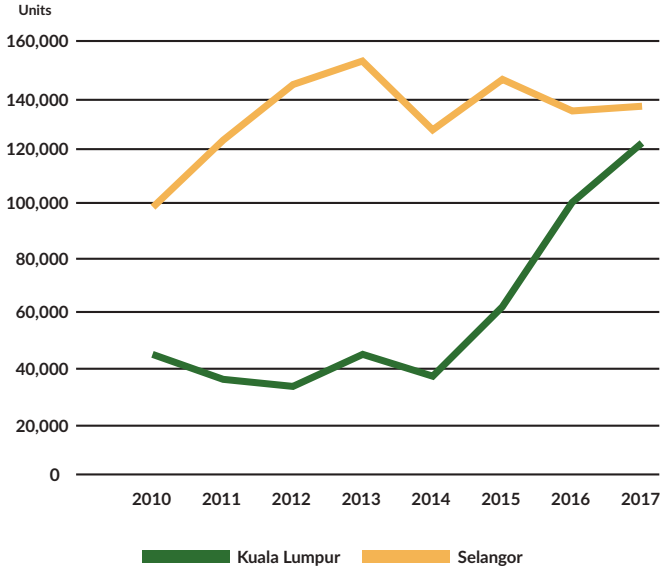
Developers were incentivised with higher permissible density on each plot to supply affordable housing through various schemes, such as RUMAWIP, PR1MA and PPA1M (Figure 3). As a result, oversupply for both affordable and free market units escalated quickly.

While the government has managed to deliver these units, is this where the demand lies? According to numbers by the Department of Statistics, population growth appears to be stronger in Selangor, compared to Kuala Lumpur (Figure 4). The signs of mismatch are observable in the high-rise home price index—where prices for Selangor homes have continued to increase, while prices for Kuala Lumpur high-rises have remained relatively flat since the onset of the diverging policies.

MOVING FORWARD

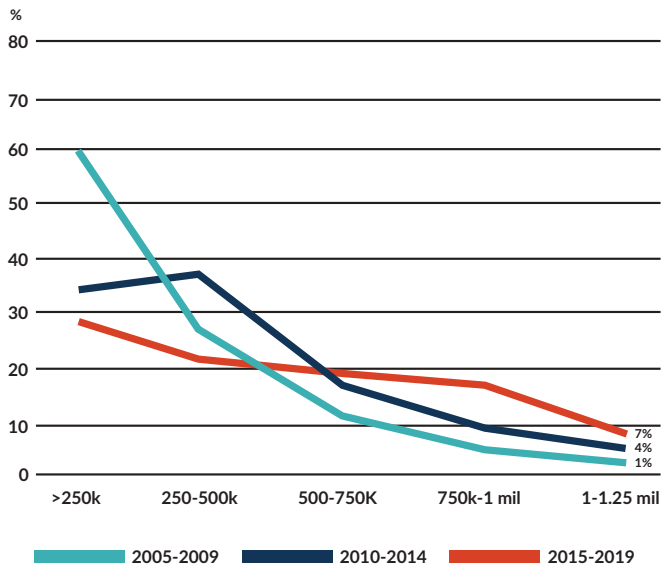
Despite the weaknesses in both the price-control and supply approach, the new federal government appears to

FIGURE 1: HOMES UNDER CONSTRUCTION BY YEAR



Source: Ministry of Housing

FIGURE 2: PERCENTAGE OF HOMES LAUNCHED IN SELANGOR BY PRICE RANGE*



* CPI-adjusted mid-point house price (2017)

continue to focus on increasing supply as a solution to the affordable housing issue under its recently launched National Housing Policy (2018-2025).

This approach is mostly a temporary solution that could result in significant overhang issues, even in the affordable segment.

Instead, both federal and state governments could consider:

a. **Focusing on micro supply and demand:** Instead of the build-and-wait approach, a micro supply and demand analysis of the neighbourhood allows the government to better incentivise and control supply of the right housing to each area. Micro-analysis needs to include localised pricing analysis to ensure that affordability is taken into account within the geographical context and not artificially standardised across the board.

   Under the National Housing Policy 2.0, there are intentions to ensure the approval of housing is in line with local affordability. under Action Plan 2.2.3. Unfortunately, the affordability report will only be published in 2020 and appears to be planned only in periodic intervals. Housing and income are dynamic, and the government should consider a more dynamic approach for long-term sustainability of this policy.

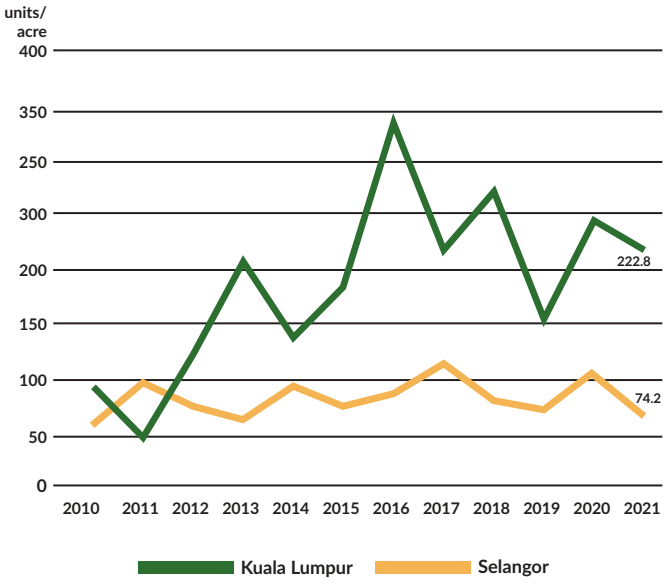
b. **Discarding the 'disposable housing' mentality:** Governments are often focused on announcing the construction of 'new' affordable housing, while ignoring the supply of existing units in the market and opportunities to refurbish and reuse them.

   Many neighbourhoods have ample low- and medium-cost housing in strategic locations that are currently undesired due to age, lack of connectivity or poor conditions. The government can identify these developments and invest in comprehensive urban redevelopment strategies to immediately deliver on quality housing, instead of focusing on building new units that would be abandoned and disposed in 20 years.

   Encouraging banks to finance the refurbishment of homes in the sub-sale market could also prove a more efficient use of funds, compared to subsidising new constructions.

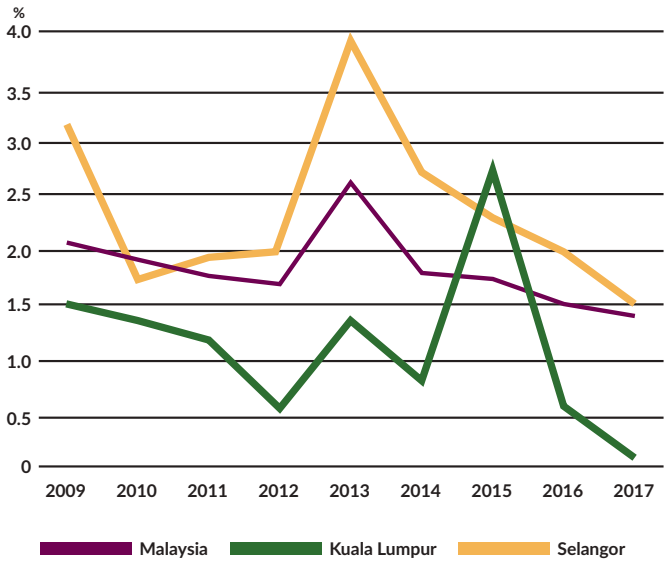
c. **Maintenance to preserve wealth:** Often, new housing is only funded

FIGURE 3: DENSITY OF COMPLETED HOUSING



Source: UrbanMetry Database

FIGURE 4: Y-O-Y POPULATION GROWTH



Source: Department of Statistics

Affordable housing is a complex and difficult issue, and our attempts to simplify and standardise approaches through price-control and supply policies have not yielded desirable results.

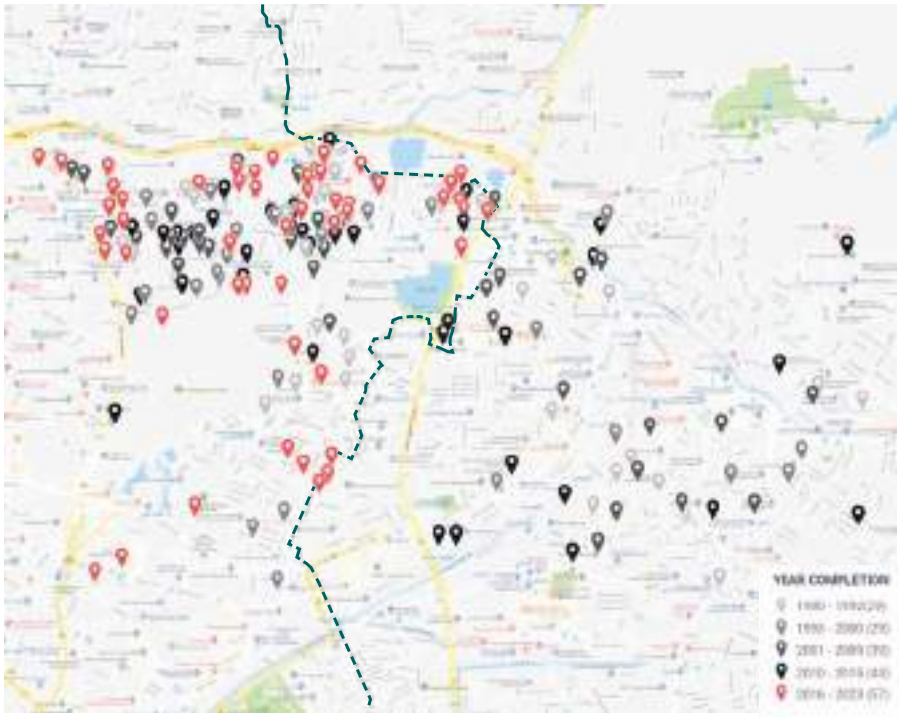
to completion, while costs for sustainable quality maintenance to ensure appreciating value of assets are ignored. Badly-maintained low- and medium-cost housing depreciates, further locking the B40 and M40 groups in the lower-income segment.

If B40 and M40 groups are being encouraged to invest a significant part of their wealth into home ownership, it is very important for governments to ensure that the value of this investment is sustained over time. To achieve this, the government should also consider subsidising the cost of engaging professional building managers for affordable housing projects to ensure quality services and legal expertise to protect the interests of all communities.

Under the new housing policy's Action Plan 3.1.5, the government will establish a National Housing Maintenance Board (3P) to manage public housing. However, this board is not involved in maintaining privately owned units of the B40 and M40 groups.

Affordable housing is a complex and difficult issue, and our attempts to simplify and standardise approaches through price-control and supply policies have not yielded desirable results.

As Albert Einstein said, the definition of insanity is doing the same thing over and over again and expecting a different result. It is time that we try a different remedy to our infernal housing woes.



New housing supply is concentrated on the Kuala Lumpur side (left) of Greater KL

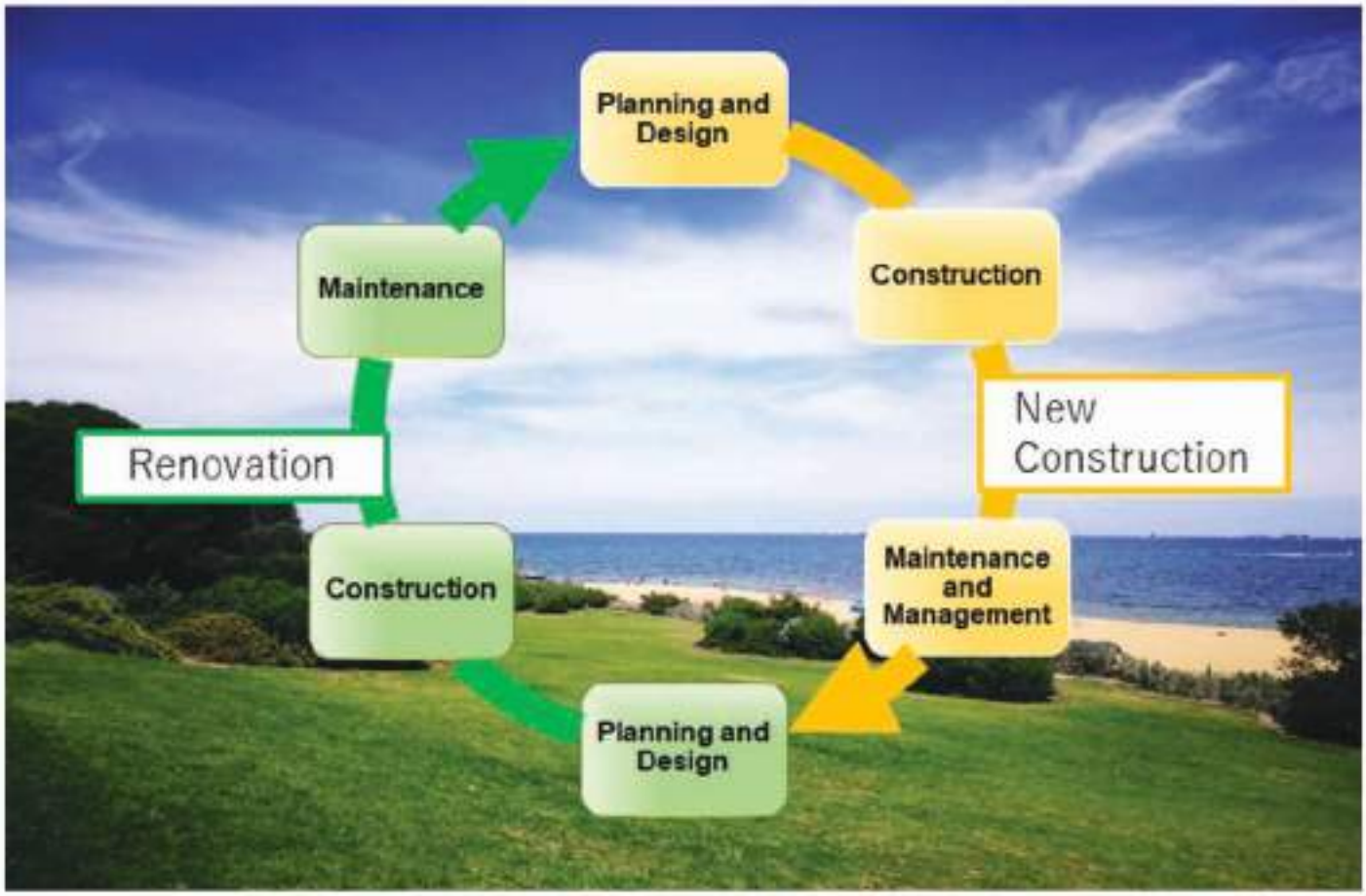
Source: UrbanMetry Database

CHA-LY KOH
CEO, URBANMETRY

Trained in city planning at the Massachusetts Institute of Technology (MIT), Cambridge, US, Koh hopes to harvest intelligence from big data to help governments, city planners, corporations and urban dwellers shape better global cities.

Koh is CEO of URBANMETRY (formerly known as Property Pricetag), a property data company that harvests, cleans and analyses city data, through artificial intelligence and proprietary algorithms, to extract trends and patterns in the built environment—for a more efficient and transparent property market, improved city planning, and sustainable urban environment.

She is the author of "The Secret Atlas of Greater Kuala Lumpur", in collaboration with Think City, which illustrates how data can help one understand the city better, spot business trends, predict property prices and track user behaviour.



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PRICING STRATEGIES FOR AFFORDABLE HOUSING PROJECTS

What should developers be aware of when evaluating bids for project tenders?

BY CHAN KHENG HOE

Every contractor bidding for a tender has two key purposes in mind: securing the bid, and maximising profits and cash flow.

In securing the bid, contractors understand that the lowest bid would usually (although not necessarily) prevail. Of course, a contractor with a higher bid could win the tender due to, say, better market reputation or experience. Nevertheless, even the most reputable contractors would rarely be able to secure a bid if their pricing is substantially higher than other bidders.

At the same time, the more contractors seek to maximise profits and cash flow, the less competitive their bids become. Therefore, every bidding exercise becomes a balancing act between

With affordable housing projects, developers should spread out the profits and overheads to avoid front-loading by the contractor.

submitting a competitive bid, while still having enough room for an acceptable margin.

On the other hand, the developer also has two purposes in mind: maximising profits, and ensuring the project can be successfully completed.

The lower the cost, the higher the profits for the developer. However, developers understand that price cannot be the ultimate factor. If the appointed contractor, for instance, is unable to complete the project, the developer would be burdened with much higher costs and project delays.

Therefore, while seeking to maximise profits, developers have to be sufficiently concerned about the contractor's profits and cash flow to ensure that the project can be successfully completed, preferably on time and within budget.

NO ROOM FOR ERROR

The above conundrum is amplified when applied to affordable housing projects. With luxury housing, the profit margins would usually allow for costing errors on the part of both contractor and developer. In an affordable housing project, there is no such leeway.

When officiating the Residensi Bayu Andaman topping-off ceremony, the Housing and Local Government Minister Zuraida Kamaruddin announced that the National Housing Policy 2018–2025 would seek to encourage easier home ownership among the B40 and M40 groups.

At the heart of the policy is the intention to 'ensure the homes are not only affordable, but of high quality'. These high quality affordable homes must be more than 900 square feet in size and be equipped with facilities.

This puts a burden on developers who undertake affordable housing projects to ensure that their appointed contractors can deliver the projects within the anticipated costs. Any mistakes in costing or project delays would significantly impact the cost of the houses and, ultimately, their bottom line.

For private developers, a respectable bottom line will ensure that their businesses remain sustainable and that the supply of affordable housing would continue uninterrupted. The best way to achieve a respectable bottom line in affordable housing projects would be to ensure that costs are kept well within control.

TYPES OF PRICING STRATEGIES

Developers would therefore have to be aware of the pricing strategies adopted by contractors to help them win bids and maximise profits. There are four main pricing strategies adopted in construction contracts—two of which would be detrimental in an affordable housing project, one that has to be approached with caution, and one that ought to be encouraged where possible.

Front-Loading

In every construction contract, there are front-end works and other works. Front-end works would include items such as site preparation, mobilisation, excavation and foundation or sub-structure works.

In a front-loaded contract, the contractor increases his rates for the front-end works and reduces his rates for the other works to ensure that the overall price of the contract remains competitive.

While the contract sum remains the same, the contractor gets a much higher profit upfront. This would improve the contractor's cashflow for the project.

However, the risk for the developer is that the contractor may not be sufficiently motivated to keep up with the schedule and quality of works required towards the end of the project. After all, the contractor would have already secured a substantial part of the profits anyway. In the event that a replacement contractor is required to complete the balance works, the cost would definitely be much higher.

A developer undertaking an affordable housing project ought to spread the profits and overheads throughout the project to avoid the practice of front-loading by the contractor.

Claims Loading

An experienced contractor would usually have a sense of where quantities have been under or overprovided for in a bill of quantities prepared for tender purposes. For the underprovided items, there would be a high likelihood of an increase in quantities, while for the overprovided items, there would likely

	ACTUAL	FRONT-LOADED
Front-end works	RM900k + RM100k profit= RM1 mil	RM900k + RM600k profit= RM1.5 mil
Other works	RM7.8 mil + RM1.2 mil profit= RM9 mil	RM7.8m + RM700k profit= RM8.5 mil
Total	RM10 mil	RM10 mil

Table: Example of front-loading

Uncertain costs can wipe out any profits in affordable housing projects

be omissions.

The contractor then increases his rates for the underprovided items and reduces his rates for overprovided items, and waits for the inevitable variations to occur. This can turn out to be a very profitable strategy for the contractor because variations can add substantially to the costs of the contract.

The developer, on the other hand, would have to deal with uncertain costs, which could wipe out any profits in affordable housing projects.

There are two ways a developer can overcome such a scenario:

a. Adopt a lump-sum contract approach based on detailed construction drawings and not rely on quantities. This puts the burden on the contractor to ensure that his own calculations would be adequate.

b. Stipulate in the contract that any deviations in costs cannot be more than a certain percentage, say 10 per cent. This mechanism would be effective to cap costs, provided the contractual provision has been drafted carefully and meticulously. Otherwise, the cap may be ineffective.

Pricing Qualifications

A contractor may seek to distinguish his bid by submitting a qualified tender. A qualified tender is one where the contractor stipulates certain conditions that would lead to an adjustment of the contract price. Examples of a qualified tender include:

A respectable bottom line will ensure that businesses remain sustainable and the supply of affordable housing continues uninterrupted. The best way to achieve this in affordable housing projects is to ensure costs are kept well within control.

a. The contractor submits alternative materials instead of the materials specified in the bills because he is able to procure these alternative materials at competitive rates.
b. The contractor may impose a condition that he be allowed to work for extended hours.
c. The contractor agrees to accept deferred payments, partially fund the project, undertake to purchase some units, or undertake to complete the works in a shorter time-frame.

The developer should regard this approach with caution. It may turn out to be advantageous for both developer and contractor, but if the qualified bid is not scrutinised meticulously, there may be unexpected pitfalls.

For example, the offer to procure alternative materials at a cheaper rate would be desirable if the alternative material is comparable to the original specifications. Otherwise, there may be substantial quality issues that could be costly to remedy.

Negative Rates

A fourth pricing strategy commonly adopted by contractors is to insert a negative rate. By inserting a negative rate, a contractor reduces the contract sum but extracts a non-financial benefit in return.

For example, a contractor required to handle demolition works may insert a negative rate on the condition that he is allowed to retain and salvage all materials from the unwanted premise. There could be a sufficient profit in those materials for the contractor to justify the negative rate, which further serves to place the contractor in an advantageous position as far as the tender bid is concerned.

Unless a developer can easily convert these items into cash, the use of negative rates ought to be encouraged.

MOVING AHEAD TOGETHER

While the developer and the contractor may seem to have opposing interests in the initial stage, however once a contractor is appointed, their interests are in fact aligned. Both need the project to be completed as quickly as possible and at the lowest possible costs.

This alignment of interests becomes even more acute when the project involves affordable housing.

This is because firstly, the sale price of the end units would not have as much a margin buffer to allow for errors. Secondly, there would be social consequences involved when an affordable housing project fails, which will also attract the attention and scrutiny of the government.

Therefore, developers and contractors would do well to deal with each other transparently from the very start and to work alongside as partners, rather than adversaries, to ensure the prompt delivery of the project. This is a best practice that is often observed in more developed jurisdictions, but may still be lacking within the context of Malaysia.

Hopefully, this will soon change.

CHAN KHENG HOE
Principal, Kheng Hoe Advocates

Chan is a Malaysian construction lawyer, focused on construction and building contract disputes.

He is a Fellow of the Chartered Institute of Arbitrators, and a panel arbitrator, adjudicator and mediator with the Asian International Arbitration Centre. He also sits on the Contracts & Practices Committee of the Master Builders' Association of Malaysia, and has spoken and written extensively on matters related to construction law.

BCI ASIA AWARDS 2019

RECOGNISING THE LEADERS IN ARCHITECTURE & CONSTRUCTION

INDONESIA 23 APRIL 2019 RAFFLES JAKARTA

HONG KONG 17 MAY 2019 ROSEWOOD HONG KONG

VIETNAM 31 MAY 2019 SHERATON SAIGON HOTEL & TOWERS

SINGAPORE 7 JUNE 2019 FAIRMONT SINGAPORE

PHILIPPINES 14 JUNE 2019 GRAND HYATT MANILA

THAILAND 18 JUNE 2019 CENTARA GRAND BANGKOK

MALAYSIA 21 JUNE 2019 JW MARRIOTT HOTEL KUALA LUMPUR

BCI ASIA AWARDS

The annual BCI Asia Awards—now into its 15th year—recognises developers and architecture firms that have built and designed the greatest volume of buildings in seven Asian markets: Hong Kong SAR, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. This event seeks to encourage the creation of socially-responsible architecture, and remains one of the most coveted awards in the regional building industry while serving as a platform for domestic and international networking among elite architecture firms, property developers, manufacturers and service providers.

FUTURARC GREEN LEADERSHIP AWARD

FuturArc Green Leadership Award

FuturArc Green Leadership Award seeks out ecologically responsible buildings in Asia, recognising the team behind a completed project (architects, developers, consultants, contractors, etc.) who has collectively raised the bar of what a Green building is in Asia. Projects are judged on how the project delivers specific, measurable outcomes, based on the criteria of resilience; wellness; embeddedness; ecosystems; and replicability.

FUTURARC PRIZE

FuturArc Prize

FuturArc Prize aims to encourage and generate forward-thinking, innovative design ideas for Asia. The competition has been the leading platform for professionals and students who are passionate about the environment to envision a more sustainable future. Every year, FuturArc Prize has reached out to thousands of professionals and students from the region and beyond to propose ideas based on a different brief or challenge.

IDA INTERIOR DESIGN AWARDS

BCI Asia Interior Design Awards

This competition awards excellent interior designs of projects located in the seven BCI Asia markets: Hong Kong; Indonesia; Thailand; Malaysia; Philippines; Singapore and Vietnam. It seeks interior architectural designs that stand out aesthetically, functionally and ergonomically, based on the criteria of spatial design; comfort; aesthetics; innovation; and realisation efficiency.

TOPTEN ARCHITECTS & DEVELOPERS

BCI Asia Top Ten Architects & Developers

The BCI Asia Top Ten Architects and Developers Awards identify firms with the greatest aggregate value of projects under construction during the last full calendar year by the extent of their sustainability and confirmed Green building ratings. The criteria for the Top Ten Architects also include projects from the pre-tender stages to recognise early-stage Green design efforts.

NATIONAL HOUSING POLICY 2018-2025 LAUNCH

28 January 2019

Malaysia's Minister of Housing and Local Government Zuraida Kamaruddin launched the new National Housing Policy, which comprises five key focus points, with 16 strategies and 57 action plans.

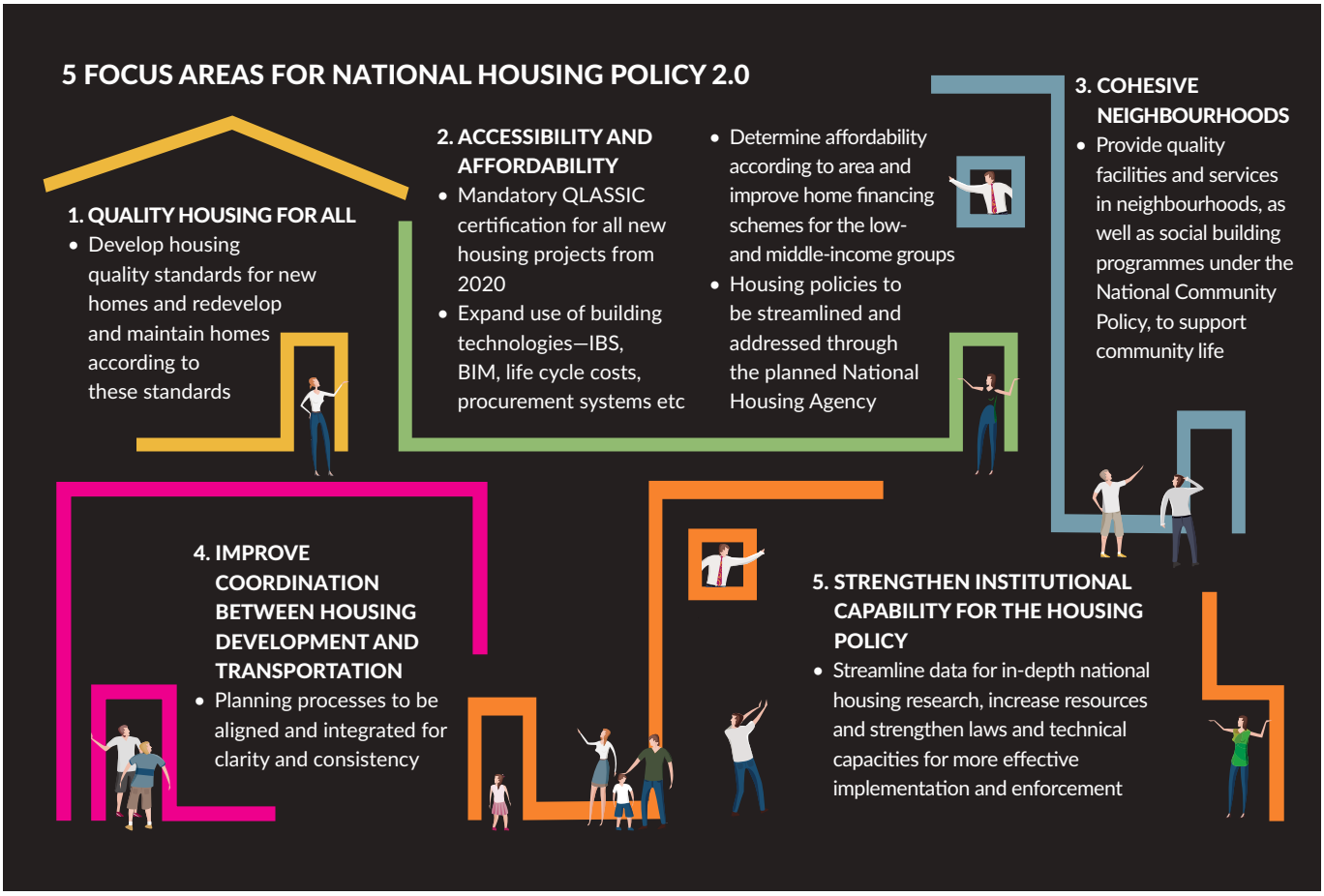
One of the action plans taken is the rationalisation of housing agencies by moving three main agencies to be under the housing ministry's purview—these include Perbadanan PRIMA Malaysia, Program Perumahan Penjawat Awam Malaysia (PPAM) for civil servants, and Syarikat Perumahan Nasional Berhad (SPNB).

One of the sub-policies is the National Affordable Housing Policy, which outlines the standards and main specifications for quality affordable housing, whether by the government or private sector. Under this policy, affordable home prices will be fixed between RM90,000 and RM300,000, depending on location and local average income, and should be at least 900 square feet, with infrastructure and amenities.

At the launch, Zuraida said the government is targeting to build 100,000 affordable homes by the end of this year, in line with its manifesto to provide 1 million budget housing over a decade. The government will also focus on the rent-to-own (RTO) concept for now, and move towards build-then-sell (BTS) by 2023.

In the same ceremony, the minister witnessed the signing ceremony of an MoU between the ministry, Pembinaan Kery Sdn Bhd and Tisy Sdn Bhd. These two companies will be working with the ministry to offer 2,600 affordable homes and transit homes for unmarried wage earners.

Zuraida (second from left) at the launch



BOOK LAUNCH OF 'THE TROPICAL MALAYSIAN HOUSE'

19 January 2019

Published by Atelier International, this 288-page tome by Robert Powell, Professor of Architecture at Taylor's University, highlights 25 residential projects that help define what a modern 'tropical' house is.

The homes are chosen based on 12 key sustainability attributes and the Green Building Index (GBI) standards. They are designed by various architects and designers, including Ken Yeang, Wooi Lok Kuang, John Bulcock, Renè Tan, Ken Wong and John Ding, David Chan and Chan Mun Inn, Lee Cherng Yih, Shin Chang, Penny Ng, Kenny Chong, Eleena Jamil, Farah Azizan, Adela Askandar, Ang Boo Chung, Wen Hsia Ang, Wng Wei Ping and Tey Tat Sing.

The Tropical Malaysian House, Volume 1

The launch included a talk by Powell and an exhibition by the book's photographer Lin Ho. Ar Ezumi Harzani Ismail, president of the Malaysian Institute of Architects (PAM), gave the opening address.


Chan (middle) with two of MGBC's 2019 partners

MGBC 10TH ANNIVERSARY NETWORKING NIGHT

18 January 2019

The Malaysia Green Building Confederation (MGBC), together with strategic co-organiser Brunsfield International Group, celebrated its 10th anniversary with an evening of networking.

About 130 guests attended the event, comprising various parties in the built environment industry, from bankers, lawyers, developers and contractors to facility managers, architects and engineers, among others.

MGBC president Ar Chan Seong Aun launched the organisation's new logo and website, signalling a renewed push as it faces new challenges in 2019. Past president and GPM director Ir Tang Chee Khoay officially launched the 5th edition of the Green Pages Malaysia directory.

BCA–REDAS BUILT ENVIRONMENT AND PROPERTY PROSPECTS SEMINAR 2019

14 January 2019

The seminar by the Building and Construction Authority (BCA) and the Real Estate Developers' Association of Singapore (REDAS) covered the opportunities and challenges of Singapore's built environment in 2019.

In his opening address, Minister of State for National Development and Manpower Zaqy Mohamad said that construction demand is expected to be between SGD27 to SGD32 billion this year, with public sector contracts contributing about 60 per cent of demand, as the industry continues to recover from a challenging three-year spell.

Moving ahead, said Zagy, innovation will be key to support the built environment sector transformation, such as the adoption of Integrated Digital Delivery; an advanced and integrated supply network with smart logistics systems; and the use of robotics and automation on-site.

The BCA will also be expanding the Building Innovation Panel (BIP), an inter-agency panel for acceleration of regulatory clearance for productivity-enhancing technologies set up in 2011, to include advanced and sustainable building materials and Green building technology.

Other sessions included the economic outlook for the year by OCBC Bank chief economist Selena Ling; Singapore construction prospects by Teo Jing Siong, BCA's group director of strategic planning; and construction cost trends by Khoo Sze Boon of Arcadis Singapore, followed by a panel discussion.

UPCOMING EVENT

10TH ANNUAL AFFORDABLE HOUSING PROJECTS

9-12 April 2019,
Pavillion Hotel Kuala Lumpur

This four-day regional conference will focus on the need for more efficient and cost-saving affordable housing projects to spur transformation in the housing sector.

Jayaselan K. Navaratnam, Director General–National Housing Department of Malaysia's Ministry of Housing and Local Government, will give the keynote presentation on the formulation of a national housing framework for efficient and equitable housing.

Themed interactive keynotes on 'The Affordable Housing Framework: 10 Years On' will recap the past, present and the way forward for the affordable housing sector.

Participants can choose from one of three streams over the first two days: Smart Growth & Inclusive Communities, Design, Materials & Technologies, and Housing Finance & Innovative Models.

An Experiential Workshop on the third day will examine how technologies and processes can enhance productivity across the construction value chain, while a full-day workshop on the last day will focus on capacity building for housing public-private partnerships. The conference also includes interactive group activities and site tours.

Representatives from governments, statutory bodies and specialised agencies, as well as experts from multilaterals, financing and housing institutions are expected to be in attendance.

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CONSTRUCTION INDUSTRY COUNCIL


Cheng: New technologies help increase productivity

While the global construction sector has been relatively slow in adopting cutting-edge technologies, this does not have to be the case for Hong Kong, says Ir Albert Cheng, Executive Director of the Construction Industry Council (CIC).

In fact, innovation in construction would help Hong Kong overcome a set of challenges, such as alleviating labour shortage and lowering construction costs. Hong Kong's construction cost ranks third-highest in the world, and Hong Kong remains the most expensive Asian city, according to a report by Arcadis.

"The city is also constrained by land scarcity, driving high-rise construction," says Cheng. "We are facing an aging population and a younger generation that is generally uninterested in joining the construction industry.

"With technological advancements in construction, we want the next generation of our workforce to realise that they are in skilled blue-collar positions, like working in an automated manufacturing plant," he adds.

In early 2018, the Hong Kong government announced in its Budget a HKD1 billion Construction Innovation and Technology Fund (CITF). The five-year initiative is a matching fund covering technology adoption and manpower training. Although many of the technology solutions involve automation, Cheng says that there is no concern about employment opportunities being replaced by technology and innovation.

Hong Kong is estimated to have building projects in the pipeline valued between HKD25 to 30 billion, representing sustained demand for construction workers. "It is more important to adopt new technologies to increase productivity of our existing labour force and to attract youngsters to join the workforce," he says.

The Construction Innovation and Technology Application Centre (CITAC) has been opened since 2017. What are the objectives and key features of this centre?

As one of the CIC's sustainable initiatives, CITAC serves as a knowledge hub by collecting, showcasing and promulgating the latest local and overseas construction technologies with a view to promoting the implementation and application of construction innovation in the local construction industry.

CITAC also aims to improve the productivity of small and medium enterprises with the education and adoption of innovative construction methods, hence driving the industry to 'Construction Industry 2.0' in the near future.


CITAC serves as a knowledge hub to prepare for Construction Industry 2.0

How do you see the application of technology and innovation in Hong Kong at the moment? How will CITAC change the industry in the future?

Innovative technology has been transforming the construction sector worldwide. For example, Building Information Modelling (BIM) allows visualisation of designs to enhance planning and coordination in the construction process, contributing to significant reduction in material wastage as well as pre-empting safety pitfalls and unworkable designs. The concept of Design for Manufacture and Assembly (DfMA) advocates off-site manufacturing, which can reduce manpower and time requirements. Modular Integration Construction

Smart Management System for Lifting Gears

Building Information Modelling (BIM) Applications in Construction Process

Automatic Wall Plastering Machine

(MiC), which replaces conventional site operations with off-site prefabrication, is an example of DfMA.

Automating and mechanising repetitive construction processes enhance productivity and safety. The use of advanced technologies would also uplift the professional image of construction practitioners and help attract new blood.

These benefits notwithstanding, Hong Kong is lagging behind in the adoption of new construction technologies. CITAC would like to encourage the industry to be courageous, identify innovative techniques and technologies that are applicable in Hong Kong, thus facilitating sustainable development of the industry.

The use of new methods and technologies may incur additional investments in machinery and equipment, which would add to upfront costs. The CITF supports the financing for adoption of construction innovations. Initiated by the HKSAR Government and administrated by CIC, the HKD1 billion fund is open for application in the next five years to promote wider adoption of innovative construction methods and new technologies, with a view to promoting productivity, uplifting built quality, improve site safety and enhance environmental performance.

What are the highlights of the existing 2nd Round Exhibition launched in November 2018?

The exhibition features more than 40 exhibits, showcasing the latest construction technologies, such as 3D-printed concrete structures, drones with protective cages for confined space inspections, and cloud-based BIM applications, etc. There are also examples of big data and artificial intelligence applications for the construction industry.

What are the Hong Kong government's initiatives with the adoption of BIM?

On 1 December 2017, the Development Bureau (DEVB) issued the Technical Circular (Works) No. 7/2017 on the Adoption of BIM for Capital Works Projects in Hong Kong, which states that "Capital works projects with project estimates more than HKD30 Million shall use BIM technology. The policy is applicable for projects in the

Unmanned Aerial Vehicle (UAV) with Protective Cage

Application of Mixed Reality (MR) Technology

3D-Printed Concrete Structure

investigation, feasibility, planning, and design or construction stages in the Capital Works Programme, irrespective of the modes of delivery as detailed in the ensuing paragraphs."

In the 2018 to 2019 Budget Speech, adoption of BIM technologies was again mentioned by the Financial Secretary. In Paragraph 112, 2018-19 of the Budget, it states that "Starting this year, the government will adopt BIM technology in the design and construction of major government capital works projects. The CIC will formulate BIM technical standards, help equip the industry and encourage the use of such technology in private works projects."

CIC will continue in this endeavour to promote BIM technologies for the local industry.

How about the adoption of DfMA?

The construction sector has begun to adopt DfMA. By manufacturing construction components with the most cost-effective materials and processes at off-site facilities and assembling them at reduced costs and minimal onsite operations, construction projects can be delivered with higher quality and lower costs.

At CITAC's 2nd Round Exhibition, we have showcased video footage of the most advanced concrete product factory in Europe—Laing O' Rourke Explore Manufacturing, which is a prime example of high quality off-site construction.

We have also showcased exhibits and project references of MIC, which is an innovative construction method with the application of DfMA principles. By adopting the concept of factory assembly followed by on-site installation, MiC helps to ease some of the current challenges faced by the local construction industry.

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MANUFACTURING HOMES WITH BIM + IBS

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Gamuda's new RM400 million digital IBS factory

Imagine homes being built, not brick by brick, but by robotic arms on a factory conveyor belt.

That is what is happening in the first digital industrialised building system (IBS) factory in Malaysia, where the discrete manufacturing lines efficiently churn out homes unit by unit.

Carousels bring pallets from one station to another, as floor slabs and wall panels are moulded via a shuttering system; wire mesh, lattice girders and cast-in items are inserted; concrete is poured, smoothened and cured; and the finished components are demoulded and mounted onto crates, carefully arranged for perfect balance. A full run for each pallet takes about 10 to 12 hours, which works out to about one housing unit per hour.

Since July 2016, Gamuda Bhd's facility in Sepang, Selangor, has manufactured more than 3,000 high-rise apartment units. Currently, it can produce 3,000 homes a year, and expansion plans are in the works to increase capacity to 5,000.

Combined with the company's new RM400 million plant on a 27-hectare site in Banting, which began operations in 2019, the IBS factories will be able to produce a total of 10,000 property units annually. Its first manufactured landed homes were also rolled out in February 2019.

THE DIGITAL CONNECTION

The main difference between digital IBS and conventional IBS lies in the need for building information modelling (BIM) to operate the robotics in the production process. Conventional precasting typically involves many construction workers working on the formwork manually, often in an open yard.

"Our IBS factory is digitally operated," says Tan Ek Khai, general manager of Gamuda Industrial Building System Sdn Bhd (Gamuda IBS). "It's no longer just taking the construction offsite and using the same manual work. It is basically

replacing the whole chain of construction activities and changing it into manufacturing in a controlled environment. The elements move around the factory, like in a car manufacturing plant."

The entire robotic production system—with technology from Italy and Germany—runs on a BIM platform, which dictates to the operations of the robots to ensure precise, efficient and highly customisable products.

"Our in-house team of design engineers works very closely with architects and consultants to come up with the piece-by-piece shop drawings, which are translated into the production system," Tan says.

"We also provide the second link, which is our construction arm. We work very closely with each other, and they give us feedback on how we can improve our designs."

PRODUCT DEVELOPMENT

Digital IBS also offers a wide range of products that can be produced in various sizes, specifications and quantities.

"Many conventional precasters only do single components—there has not been a one-stop centre that does everything together—so when there are leaks or problems, there is always finger pointing," says Tan. "We have now become a single source and single point of delivery for everything—from design and manufacturing to logistics, delivery and installation."

Some of the new products produced in the Banting factory include double walls, pre-stressed half slabs, prefabricated bathroom pods and special façade elements.

The double-wall panels—consisting of a pair of reinforced concrete shells, with a cavity that will be filled with concrete on site—are structurally strong enough for construction up to 50 storeys high.

A long-bed production line will deliver half a million square metres of pre-stressed half slabs annually.

The highly customisable bathroom pods come complete with electrical, plumbing and ventilation connections, for easy installation ala plug-and-play. As a single seamless waterproofed unit, it also minimises common problems such as leakages and mould.

"A lot of R&D is being put into what we do here at Gamuda IBS," says Tan. "We are developing new products and construction technology that improves productivity and efficiency. The second half of 2019 will see more of our products coming online in the homes we are building."

AFFORDABLE QUALITY

Apart from the group's own properties and other private developer clients, Gamuda IBS is positioning itself to help the government achieve its target of providing 1 million affordable homes in the next 10 years—or 100,000 units a year.

"With digital IBS, we can save 12 months in high-rise construction," says Tan. "And unlike conventional precast, we have the flexibility to handle variations in design."

For example, their 714-unit Rumah Selangorku (RSKU) project in Jade Hills, Kajang was completed in two years, instead of three, and the 280-unit RSKU in Kundang Estates in 18 months. It is also on track to complete 864 units of Cyber Valley RSKU ahead of schedule (see page 58).

Highly customisable bathroom pods can come fully fitted

All images by Gamuda IBS

The Banting factory manufactures double walls for even taller buildings

Just 'plug and play': No wet works required with the bathroom pods

Gamuda's RSKU project in Jade Hills, Kajang: first digital IBS project

The prefabricated homes are fully tested and Sirim-certified, with improved sound and heat insulation and better resistance to fire and rot.

"Cost-wise, there is a premium for automation and digitalisation, but we have brought it down to less than 5 per cent, compared to 15 to 20 per cent for conventional precast, partly because we have the scale," Tan says. "If you look at the overall project construction cost, we would be bringing down costs with IBS because the lead time to finishing a project is much faster, which reduces financing and other costs for the home buyer."

CONSTRUCTING THE FUTURE

The adoption of IBS is also part of an overarching plan to move the building industry into the next level—as outlined in Malaysia's Construction Industry Transformation Programme (CITP) 2016-2020—through digital construction, reduction of foreign labour, environmental sustainability and increased productivity.

"The technology and evolution of manufactured homes will now become a mainstay of construction," Tan predicts. "If you look at the world, companies such as Amazon and Softbank are already making big investments in home building technologies. We are just following the global trend to get ourselves ready for the Industrial Revolution 4.0."

In Malaysia, the private sector's adoption of IBS currently stands at an estimated 35 per cent, according to the Construction Industry Development Board (CIDB). The Housing Ministry has mandated IBS adoption for private projects worth RM50 million and above, with a minimum score of 50, by 2020.

Push factor notwithstanding, Tan believes the business case for IBS is compelling in itself.

"As we are now entering the third year of operations, clients are starting to understand the time value of what we offer, which gives them greater savings as a project overall," he says.

"Labour cost is increasing, with minimum wage, increased levies and the significant clampdown on illegal foreign labour—these will be operating realities for a lot of contractors in town. With automation, we can reduce dependency on foreign and manual labour by up to 70 per cent."

At the same time, Gamuda is also upskilling local youths from technical and vocational training institutions to use digital IBS technologies, such as BIM and Common Data Environment (CDE).

"We are building a workforce for the future," says Tan.

"Our job is to make it convenient for people to adopt IBS, and with more than half a billion Ringgit already invested in the two factories, we are here to stay."

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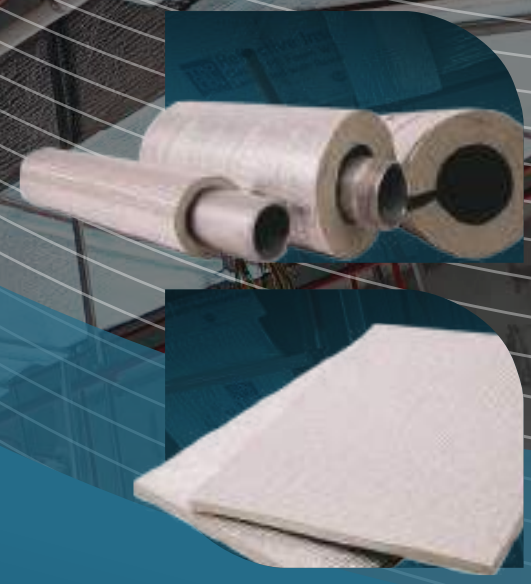

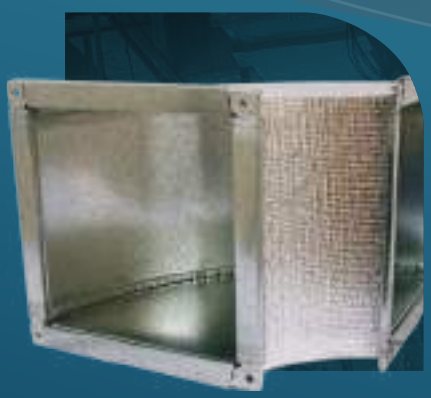

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Scope : Manufacturing and Conversion of Crosslinked Polyolefin Foams

A kenaf farm in Kota Bharu, Kelantan

GROW YOUR OWN HOME

How a humble fast-growing crop offers solutions for low-cost eco-construction in Malaysia

Most Southeast Asian countries share a common problem: the scarcity of suitable and affordable housing for an ever-growing population. On the other hand, countries in this region often have suitable climate and abundant unfarmed or abandoned land that could be used by the rural communities to grow cash and food crops.

Back in 2016, social impact enterprise AffordAble Abodes Sdn Bhd started to investigate suitable crops that would yield a profit and promote local economies, as well as provide refuse material for the production of sustainable building materials.

What they found as most useful and fast-growing in the local climate was kenaf *(hibiscus cannabinus)*.

A LOOK AT KENAF

Indigenous to Africa and Asia, kenaf is from the same family as other fibrous crops, such as okra and cotton. Cultivated for thousands of years, it has traditionally been used as a source of food and textile fibres.

The plant is highly adaptable to different climates and soil conditions and requires minimal pesticides or weed management, compared to similar crops such as hemp or maize. At maturity, the kenaf plant components have varied applications—animal feed, compost, seed oil, paper pulp and insulation.

In Malaysia, the National Kenaf and Tobacco Board (Lembaga Kenaf dan Tembakau Negara, or LKTN) replaced the National Tobacco Board in 2009, focusing on the cultivation of kenaf as a viable alternative to tobacco with potential for large-scale economic impact.

LKTN estimates more than 2,000 hectares are being cultivated for kenaf production (not including private growers), primarily in Kedah, Kelantan, Pahang, Perlis and Terengganu. Kenaf cultivation under LKTN is primarily focused on fibre production for industrial applications, such as automotive components or bio-composite materials, which are exported to China, South Korea, Japan, Thailand and Europe.

BUILDING WITH KENAF

The current use of kenaf as building materials is primarily as insulation and fibre-reinforced composites. Due to their low density and cellulosic structure, kenaf fibres significantly limit heat and sound transmissions, while retaining its ductility and strength. Research has also demonstrated some use of kenaf fibres as reinforcement for earth-based building blocks.

Kenaf has been identified by researchers as a suitable component of composite polymer materials, based on the strength of its natural fibres and environmentally-friendly properties.

When combined with other materials such as plastics or resins, it can be used for a wide range of applications, such as wood-plastic composites, compressed bio-composite boards, or compressed fibre for decorative purposes. While these materials have not been fully commercialised, early research has demonstrated its strong potential in commercial polymer materials.

MODULAR CONSTRUCTION

AffordAble Abodes has developed Kenafcrete for application in building blocks and structural panels.

Founder Tim Tan started his research by producing bricks in his partner's backyard, using very simple machinery and tools. Today, most of the production is now run out of the company's factory near Muar, Johor.

The structural panels are the first of its kind in the market and have been designed for quick and standardised installations. They are prefabricated and shipped to project sites ready for installation, saving significant time and labour costs. The entire installation system is linked to other phases of construction (such as roofing or M&E). It is estimated that a crew of six can erect the walls for a 1,000-square-foot house in just three days.

The panels are also about 50 to 60 per cent lighter than traditional concrete wall panels, which reduces the costs for foundations or structural reinforcements. For example, the developer of a current project in Kampung Lubok, Johor, was able to save 30 per cent of the foundation costs due to the lighter overall building weight. As the panels are full structural building elements, there is also no need for casting reinforced concrete beams and columns.

With the product's thermal insulation qualities, builders can save on insulation costs. Kenafcrete has also passed SIRIM fire testing and is currently being researched for fire doors and other protective applications.

Composed of more than 97 per cent upcycled biomass and binders, this composite material can help absorb and lock down greenhouse gas emissions in a permanent form. A simple 100-square-metre house can lock down the equivalent of an entire year of CO_2 emissions by a standard passenger car.

The use of upcycled materials also replaces the need for sand or granite, and by extension, eliminates environmental impact of sand and granite mining.

SOCIAL IMPACT

AffordAble Abodes seeks to empower the less fortunate to provide a home and livelihood for themselves and their families.

One of its objectives is to create sustainable economies in rural areas, which will also help to defray some of the problems of urbanisation. By expanding the use and marketability of kenaf, farmers can earn higher incomes through self-sustaining micro economies.

With the goal of 'one day, one house', the Kenafcrete system

PERFORMANCE PARAMETERS	Kenafcrete Lightweight Block	Kenafcrete Panel
Standard unit dimensions - Height - Length - Width	**200 mm** **600 mm** **100 mm**	**P3,000 mm** **600 mm** **73.5 mm**
Weight	**± 7.4 kg**	**75 kg***
Density (kg/m3)	**650-800**	**500-550**
Fill materials	**Kenaf core chips, binder**	**Kenaf core chips, binder**
Frame materials	**-**	**Light gauge steel truss (structural)**
Load testing (kN) - Trasnverse load - Compressive load	**>15** **>13**	**>15,00** **>53 (single panel)** **>101 (double panel)**
SIRIM Fire Testing - non-load bearing - hose stream	**2 hours** **(1,000 °C)**	**2 hours** **(1,000 °C)** **Passed**
CIDB IBS Certification		**Certified**

Testing by: Wacker Chemicals, SIRIM QAS International Sdn Bhd

*including steel frame

only requires unskilled or semi-skilled labour with minimal product training, which will see more affordable housing being built and locals being employed.

In urban areas, AffordAble Abodes is also partnering on projects for slum redevelopment, school upgrades and high-rise apartments. It has completed several urban housing projects in Muar, with plans for others in Penang, Johor Bahru and Seremban. Its long-term goals is to provide safe and affordable 'urban transit housing' for those moving from the rural to urban environments.

A panel home in Muar, Johor

Large-size Kenafcrete panels ready for installation

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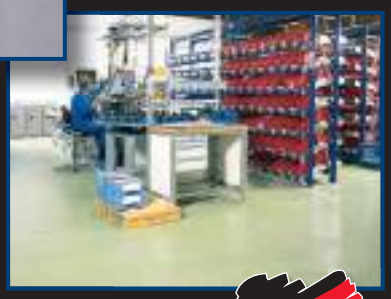

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JOHN-SON OEI

Back in 2010, a communications fresh graduate ventured into a remote village in Kuala Kubu Baru and found his calling. Today, Oei, 32, is the founder and CEO of EPIC Collective, an ecosystem of platforms and companies that promotes collaborative social impact.

EPIC stands for Extraordinary People Impacting Community. Its flagship programme, EPIC Homes, mobilises ordinary city folks to build homes for indigenous, or *orang asli* (OA), families in as fast as three days, and develop relationships while doing so.

Inspired by Lego and Ikea, Oei's idea was developed with the help of friends and more than 40 architects, engineers and designers. The result is a modular building system that has been used to build 137 homes in the past nine years, with over 5,000 volunteers from some 40 organisations and more than 50 countries.

EPIC Collective also comprises EPIC Communities and EPIC DNA, its community and training arms. The group has established itself as a consultant in community development, civilian mobilisation and capacity building. It is also involved in infrastructure projects in Cambodia.

Oei's work has won him various international recognition and awards, including being accepted into the Ashoka Fellowship; Forbes 30 under 30 2016; The Muhammad Ali Humanitarian Award for Dedication 2017; SME Malaysian Social Entrepreneur of the Year 2017; Tatler Malaysia—Force for Good Award; The Edge Inspiring Young Leaders Award; the Iclif Leadership Energy Award 2015; and Microsoft's Global YouthSpark Star award. He was also Malaysia's official flag bearer for Queen Elizabeth's Diamond Jubilee and 2012 Commonwealth Day.

Construction+ catches up with Oei to find out what his plans are moving forward.

You began building houses for the OA since 2010. What drives your passion and interest in this community?
In Malaysia, we say our strength is in our diversity, and we usually talk about that in terms of our food and celebrations, skirting around a lot of important issues. One such issue is that our diversity leaves a lot of gaps, particularly differences in socio-economic levels, which need to be addressed. For us to fully capture

the value of our diversity as we move forward, we need to find a way to include everybody in the dialogue.

The OA people, although a small minority, have tremendous value to give in terms of their resilience, beauty of culture, strength in relationships and community. The Asian way is more on interdependence, but I think many of us have lost a lot of our values in pursuit of a western idea of modernisation. I believe the OA people are still able to retain that identity; we just need to empower them so that they can teach us as a country how to move on.

What is the current housing situation in the OA community?
The problem itself is a big one. It is not that most of them do not have houses. They know how to construct their own, but they are losing access to quality materials and land, as well as skills. As their children start to adopt modern lifestyles, they usually start at the bottom and are not getting full-time jobs or earning enough to be able to purchase materials to build a quality house.

According to the last official census in 2011, there are 12,000 OA families in Peninsular Malaysia in need of homes. We suspect there may be some dent in that number since then to somewhere around 10,000.

Last year, the government allocated RM5 million for OA housing. A government-issued house would cost about RM50,000 each, so that would be 100 houses a year. If we need 10,000 homes and the government provides 100 houses a year, it is going to take forever to be able to reduce this number or eliminate the need.

How does EPIC fit in with what the government is doing to meet this need?
Over the years, we have built a pretty good relationship with the government. There is trust and respect in the work that we do, and the people we have worked with have been very transparent with us.

People often assume that government entities have all the resources needed to solve the problem. But the truth on the ground is that there are so many challenges and problems to be solved, and it cannot just be done by the government itself. But the government is also put in a position where it is very difficult for them to go out there and say, "Hey, we need your help too."

So that's where we come in. We see ourselves as a civil society-based organisation that can expand the channels of help by tapping on foundations, companies and citizens, and pushing the boundaries that a bureaucratic organisation would not be able to do.

Such as enlisting urban folks to build homes?
Self-building homes, or communities getting involved in construction, is not unheard of. In fact, it's how we used to do things until we started to be dependent on professionals to do the job. But clearly there are not enough professional contractors and developers who are willing to solve the housing needs for the entire country because sometimes there is no business case.

At EPIC Homes, our goal has always been to empower communities and people to impact the lives of other people.

Oei and his EPIC team

As of end-2018, EPIC volunteers have built 137 homes

All images from EPIC

At EPIC Homes, our goal has always been to empower communities and people to impact the lives of other people. We see some of the real physical environmental factors that hold the OA community back, such as not having enough food or leaky roofs, and try to find solutions and resources to help meet these basic needs.

The homes we build serve as foundations upon which we can add more proactive solutions to help the community—such as in areas of education and economy—so that the following generations do not have to be reliant on government or external aid. Instead, they would be able to elevate themselves and choose exactly where they want to go as a people.

We're moving into sustainable development and are working on initiatives to enhance economic activities and bringing in solution partners for other areas of needs that they have, as we work towards solving the housing issue once and for all.

What are your plans for 2019?

This is our 10th year since we started. We are very thankful that we can still do what we are passionate about. In the past few years, we have been building 25 to 35 homes annually. But this year, we are going to push this number to more than 100 homes.

I don't see it as something so impossible. As it is, we have not been actively marketing ourselves or going out there to raise funds. We have just been coasting and looking at refining our construction processes, capacity-building programmes for our builders, and allowing enough time to see the resilience of our designs.

Now that some of our houses have been sitting there for a while, we know what the limitations are and what we can do planning forward before we scale to thousands of homes. We can now leverage off the network, goodwill, strength and credibility of our brand to meet concrete targets.

In the past few years, we have been building 25 to 35 homes annually. But this year, we are going to push this number to more than 100 homes.

EPIC Homes is known for mobilising troops of volunteer builders. Will that be changing with this new direction?
We are looking at a need of 10,000 homes, so we're not just looking at all of them being built by volunteers. We need to get professionals onboard as well.

There is an element of inspiration and hope and cultural exchange—a lot of intangible value—that comes from having volunteers in a build, but we have to address the reality that it may not be necessary to have 100 per cent volunteer-built homes. Our number of build volunteers are definitely increasing, but our current volunteer base will not be able to build all 100 homes in a year unless they are full-time builders.

Apart from that, we want people to know that being a builder is not their only volunteer pathway. For example, we have another route called Pathfinders, where you get involved in the surveying, mapping and preliminary planning stages before a build.

We also see a lot of potential in growing the local labour force within the communities themselves and using this as a means of income for them. We see a lot of OA people who have been involved in building homes develop a real passion towards construction and are dedicated to the craft. So we are looking at working with more professionals to enhance their knowledge base and upskill them with more modern construction styles.

How have building industry professionals responded to your work?
They have been very supportive, and there are many individuals within these groups who are actively helping us out.

We've had engineers coming in to look at unique challenges that we have and advise us or sign off on our designs. The architect community has been very encouraging so far, while developers and construction companies have sponsored builds and helped us improve our site safety and management to reduce accidents and injuries.

We have been talking to building material suppliers and IBS companies to apply whatever solutions they have for our use.

If companies have their own construction system, we get our designers involved with them to see if we can prototype something, and if it works, then we can make it available for future homes.

We are also building a virtual materials warehouse for any excess building materials that are donated to us, which can be used for other projects or home repairs, or to supply to those who want to build their own houses.

How has your house design evolved through the years?
What we have developed over these years is not one type of house design, but a design framework that allows us to collaborate with different material suppliers and explore modular components.

The foundation of our design is based on what the people in the community are already familiar with—raised stilts, pitched roofs, a lot of room for ventilation.

Through the years, we have made some small changes to ensure the house is safer to be built and to minimise errors—because the way it is designed guides the process of construction. We have made some changes to the kitchen, seeing how a couple of families use the houses. We changed the cladding into something that is longer lasting.

Moving forward, we are looking at exploring sustainable materials that are more accessible and nearby to these communities, such as bamboo. If we are able to find an application for bamboo that can be scaled, then that also opens potential for economic growth for the communities.

This year, we are also working with the Malaysian Institute of Architects (PAM) for the Kuala Lumpur Architecture Festival (KLAF) design competition to redesign OA homes. Participants will have to design homes for two case studies—a community in a rural area that is surrounded by primary and secondary forests, and one that is much closer to urban areas, where land is scarce and space is constricted, making it harder to transport materials etc. We encourage participants to follow us to some of these communities and speak to the people themselves.

The outcome of this competition is a potential catalogue of design options that families can choose from, for a more enhanced experience in the process of receiving a home. At the end of the day, it's about giving our stakeholders, the OA people, a choice.

As a social enterprise, how does EPIC Homes sustain its operations?
Over the past 10 years, we've been selling the builds as team-building activities to companies, where we make a profit from the team-building component. Every now and then, we get a grant that covers a specific project or goal.

Up to this point, our 40-odd staff wear multiple hats in the different companies under the EPIC Group, which we run to generate revenue to sustain the non-profit side of things. This year onwards, in scaling up, we actually find a need for a dedicated team for EPIC Homes.

For example, we are currently in villages in

Bridging the divide between urban dwellers and the *orang asli* community

The *orang asli*, although a small minority, have tremendous value to give in terms of their resilience, beauty of culture, strength in relationships and community.

five states, but there are more states to be ventured into. We have not been full force in pushing to open up all 869 villages in Peninsular Malaysia—to map and survey these communities, churn out information and data to come up with different profiles, and look at matching resources and building networks to solve the issues that they are facing—because the moment you open up, you build expectations that you have to fulfil. We will need a main EPIC Homes coordination team to look into all these and to actively raise funds.

We also need to expand our talent pool and be able to retain them, so we're taking on more commercial projects—such as toy libraries, community centres, schools and meditation centres—under our EPIC Communities arm.

We are looking at how to scale up the kind of impact that we have. We have been toying with a couple of concepts for housing under the Hardcore Poor Housing Programme (PPRT) in rural and urban areas. We are also positioning ourselves as a creative hub that people can get involved in for development, in areas such as master planning, energy solutions, food production systems and placemaking.

It seems like all roads are leading us to be that kind of agency that is able to function at a larger scale, not one house at a time, but entire master plans.

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CERINA NIKEN RANI ANGGRAINI

With her expertise in urban design and master planning, Cerina seeks to deliver innovative solutions for sustainable living.

Trained as an architect and urban designer in Parahyangan Catholic University Bandung, West Java, and later in Columbia University New York under Fulbright Scholarship, Cerina is now vice president at CPG Consultants—one of Asia Pacific's multi-disciplinary one-stop consultancy firm—and council member of the Singapore Institute of Planners.

With more than 20 years of comprehensive design experience with a range of project types, from healthcare, and industrial parks to residential townships and commercial mixed developments, Cerina shares her thoughts and experiences with *Construction+*.

How did you get involved in urban design, and how would you describe your approach in this field?
I have always been fascinated with urban design, as it deals with the public realm and the in-between spaces of public and private.

The field of urban design was introduced to me in my last two years of architecture curriculum in university, and I simply fell in love with it. After my graduation, I moved back to Jakarta to work as an urban designer.

My signature style is to take a pragmatic and sensitive approach to every project, considering not only the design itself, but also the local contexts, users and market conditions, among other defining forces.

How does this approach apply in terms of designing and planning urban environments for affordable housing projects?
Affordable housing schemes are often key components of our large-scale developments. Having an understanding of the local context where the project is located in is crucial in ensuring that the urban solutions we propose are both implementable and successful.

One fundamental thing to consider is the social and humanity aspect of it. As architects and urban designers, we need to understand the customs, routines and daily activities of local residents, and in turn, the spaces needed to accommodate these activities.

By understanding this, and accounting

for other contextual forces, we could then propose appropriate solutions and designs to shape the spaces more effectively and efficiently. The result is a more sustainable and liveable environment that people actually use. There are, unfortunately, cases where housing areas are over-designed and eventually unused, which defeats the design intent.

With Singapore's home ownership already exceeding 90 per cent of the population, do you see any other housing challenges that need to be addressed?
I do believe that Singapore has been prudent with the planning of the housing policies and mechanisms involved. It has proven to be effective, and we definitely can see the results.

Even in good times, one must not get complacent. It would be good to review these long-standing housing policies and mechanism to ensure that it doesn't result in any impending issues.

Moving forward, one of the challenges to note would be the balance between supply and demand of housing, both public and private, which has implications for the housing markets and home prices. Singapore's population growth has been relatively low for the past few years, so the government has to ensure there will not be a glut in the market.

Another major challenge is housing for the country's ageing population. Singapore's population is ageing rapidly, with the 65-years-and-older population projected to double by 2030. Many seniors will be living in larger-than-needed-flats as their children move out or their partner passes away.

So the issue now is how to provide age-friendly housing and neighbourhoods for this population. A lack of supply of smaller-sized housing might occur if these seniors decide to downgrade their houses around the same time. We need to be ready when this 'silver tsunami' hits in 2030.

Successful urban design requires strong teamwork

Images by CPG Consultants

To have our designed spaces work and become vibrant places that people enjoy and use for many years to come is already an achievement in itself.

At CPG Consultants, we are currently collaborating with the Lee Kuan Yew Centre for Innovative Cities, Singapore University of Technology and Design, Geriatric Education & Research Institute, Tierra Design and Lekker Architects, together with government agencies (Urban Redevelopment Authority, Agency for Integrated Care, Building and Construction Authority, Housing & Development Board, and Ministry of Health), to come up with innovative planning and design of age-friendly neighbourhoods in Singapore. The project is funded by the Ministry of National Development and National Research Foundation Singapore under the Land & Liveability Nation Innovation Challenge (L2 NIC) grant.

What would you consider your greatest accomplishment as an urban planner?
In CPG Urban Planning, we have a thinking approach called 'Cities of Success', where

Master planning involves not only design but also local contexts, users and market conditions

Understanding the local context where the project is located in is crucial in ensuring that the urban solutions we propose are both implementable and successful.

our designs have to be sustainable, memorable, and marketable. If spaces that we design achieve these three objectives, I believe we have succeeded, and that itself will become our legacy.

Our team has won a few major accolades in the past five years, locally and internationally, and awards always motivate us to create better designs and solutions for our projects. But for me personally, we are not doing projects just to win awards—awards are only a bonus for doing good work.

Urban designers are a populist bunch, so our legacy will be the successful public spaces that we have created. To have our designed spaces work and become vibrant places that people enjoy and use for many years to come is already an achievement in itself, and I feel it is much more rewarding.

What are your upcoming plans for the year?

I believe change is the only constant thing in life, so I always seek to improve myself by expanding my knowledge, be it relating to urban design or even management and leadership, as I currently assist our studio head in leading the CPG Urban Planning studio.

Successful urban design requires strong teamwork. Our team right now is one of the finest team I have ever worked with, but I believe we still have room for improvement. I aim for our team to be even better in the future, to always deliver more innovative solutions and create better places for all.

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MADE IN BRITAIN

Twin star-shaped blocks with a multi-storey carpark in between

RUMAH SELANGORKU @ SELANGOR CYBER VALLEY

Affordable housing need not be boring cookie-cutter buildings.

At least that is what architect Hj Abdul Halim Suhor is setting out to prove with this Rumah Selangorku (RSKU) project—part of the Selangor government's affordable housing programme.

It is sited on 14.4 acres within the Selangor Cyber Valley—a 1,300-acre planned 'smart city' by Perbadanan Kemajuan Negeri Selangor (PKNS), the state's development corporation that developed this subsidised housing project.

Comprising 864 units of 1,000-square-foot apartments—priced RM220,000 and below—with facilities such as kindergarten, convenience shop, multipurpose hall and surau, this RSKU project has several design and building distinctions that set it in a class of its own.

WIDE-ANGLED BLOCKS

First off, the project is designed as two multi-storey apartment blocks with three wings each—forming three-sided stars with central lift cores.

"It is more common to lay out the blocks at the site boundaries, but ours is different—we wanted to pull everything to the centre," Abdul Halim tells *Construction+*. "This lends a sense of depth of perspective, instead of one big wall."

This atypical star-shape not only provides a multi-faceted

façade, but also offers residents better views of the surroundings. At the same time, with the wide-angled wings, the entrance of each unit does not directly face the opposite unit, giving residents more privacy.

The blocks' orientation takes the sun path into consideration, reducing the amount of sunlight that hits the building. With open circulation around each wing, the unobstructed wind flow helps to pull the internal heat out from the units. The building itself acts as a wind collector, increasing the wind velocity at the building's core.

"When we are building almost 900 units within a 14.4-acre site, we have to compact everything," says Abdul Halim. "But you want people to live there comfortably, so there has to be good ventilation, otherwise it will be very stuffy."

To prevent the dark and muggy air wells common in many affordable high-rise projects, the slabs between the ground and first floor of the blocks have been split to create voids, producing a stack effect that allows hot air to rise by natural ventilation. The ground floor also has a 4.2-metre-high ceiling, giving ample clearance for airflow in the common areas.

Apart from the lift core at the centre of each 'star', which has two lifts, there are also lifts at the end of each wing to promote vertical circulation. Hence, the 32 units on each floor are served by five elevators—no small luxury.

"This is just a RSKU, but we try to put in some small details to make it worth living in, rather than just building something that fits the budget but is not liveable," says Abdul Halim.

CENTRALISED PARKING

About half of the 2,117 parking bays are housed within a four-storey carpark building, located between the two apartment blocks. The carpark is designed in split levels to avoid long ramps for the comfort of users.

Having a standalone carpark allows for more versatility and efficiency in the design of the apartment blocks. For example, the units' entrances can be shifted easily without having to align with the carpark structure below.

Covered motorcycle parking is located at the ground floor of one of the apartment wings for convenience and to avoid bikes being parked indiscriminately around the compound.

MAINTENANCE-FRIENDLY

"The building lives longer than us," Abdul Halim adds. "If you don't factor in maintenance in the design, the building will end up dilapidated."

One of the key maintenance-centric design features is the large centralised gutter that runs between the butterfly, or V, roofs of the apartment blocks. Easily accessible, the gutter is wide enough for people to walk on it for easy cleaning.

"In Malaysia, it rains all year round, and gutters can get blocked or stuck," says Abdul Halim. "If the gutter overhangs from the 15th storey, how are you going to clean it up? You cannot see if it's stuck; you only find out when there is a problem. If you don't solve the water problem, the whole floor will be affected."

The units' dry yards are also screened off with concrete walls with vertical slots for ventilation, instead of metal railings that may get rusty or break.

READY, SET, INSTALL

The project is also one of the first RSKU buildings constructed using a robotic industrialised building system (IBS) technology.

The wall panels, floor slabs, bathroom trays and even staircases are prefabricated using Gamuda Bhd's digital IBS for easy installation. Grooves for piping, electrical conduits and power points, as well as decorative features, are cast into the panels, designed using building information modelling (BIM).

The use of IBS contributes to a smaller and more manageable workforce and a quieter and neater site with less construction waste. Every morning, some 200 workers will assemble for a

Stack effect allows outflow of hot air

Seamless bathroom trays prevent leakages

Large centralised gutters for easy cleaning and maintenance

Concrete screening for dry yards instead of metal railings

No more hacking with cast-in grooves for pipes

Prefabricated staircases waiting to be installed

Bird's eye view of a cleaner, neater construction site

'toolbox meeting' where they are reminded on safety procedures as there is a lot of heavy lifting involved. The site was recently awarded the municipal council's TABAS certificate for safe and clean work sites.

Foundation works began in January 2018—with some 3,000 piling points—while the IBS panels were produced concurrently. By March 2018, the manufactured structure components started to be delivered and stored close to site, ready for installation. A quality laboratory with on-site testing equipment helped to cut down turnaround time for tests to ensure consistent quality at all times.

Assembly of the structure components began in November 2018—at a rate of two-and-a-half floors a month—and is expected to be completed by middle of 2019. The straight and smooth wall panels do not require plastering before painting. The entire project is expected to be completed in 24 months, one year ahead of contractual schedule.

No doubt, this RSKU is raising the bar of affordable housing in Malaysia with its innovative designs and building technologies.

PROJECT DATA

Project Name
Rumah Selangorku @ Selangor Cyber Valley

Location
Lot PT56955, Dengkil, Sepang, Selangor, Malaysia

Expected Completion
4 January 2021 (contractual); 4 January 2020

Site Area
14.143 acres

Gross Floor Area
131,739.86 square metres

Building Height
15 storeys; 53 metres

Number of Units
864

Client/Developer
Perbadanan Kemajuan Negeri Selangor (PKNS)

Architecture Firm
Halim Suhor Architect

Principal Architect
Ar Haji Abdul Halim Suhor

Civil & Structural Engineer
Mohd Asbi Associates Sdn Bhd

Mechanical & Electrical Engineer
Perwira Al-Shura Consulting Engineers Sdn Bhd

Quantity Surveyor
Juruukur Bahan Antara

Landscape Architect
ANZ Landscape Sdn Bhd

Main Contractor
Gamuda Bhd

Images
Halim Suhor Architect; *Construction+*

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THE CRITERION EC

Inspired by Chinese paintings of mountains surrounding a lake, The Criterion Executive Condominium (EC) is conceived as a development of hills set against the Lower Seletar Reservoir, outlined by an undulating golf course.

It boasts a cost-efficiency-driven modular design with a high degree of standardisation that meets the budget of an EC, yet differentiates itself from other developments.

For example, the residential units are of standard modules, but spaces are planned with consideration for different family nucleus. Designed using an inside-out approach, selected units offer the option of customisable rooms with flexible layouts, allowing residents to create a home that is uniquely theirs, based on changing needs.

The rectangular site is tilted approximately 45 degrees north–south. Home owners generally prefer the north–south orientation to avoid the evening sun, but to fit 10 such blocks in that angled site would result in the units overlooking into each other. To resolve this, the block and unit types are designed with only the rear areas overlapping, allowing unblocked views for the frontage.

The corner blocks are strategically rotated for views towards the extensive pool and facilities. Some units are dual facing, with balconies for cross ventilation. The tilting of most blocks helps create a setback from surrounding developments and allows the façade fronting the roads to be more porous, so wind can enter the common facilities. All 10 blocks sit on a landscaped deck, with a basement carpark below. This allows the units to be elevated from the busy Yishun Avenue 1 street.

The blocks' high roofs have cantilever slabs that turn down to a gable end wall. Due to the extensive cantilever, a variety of

Clubhouse and gym

The residential spaces are planned for flexible layouts to meet changing needs

Grand entrance

gondola mounts and arm lengths had to be planned and detailed specifically to enable safe access during the roof casting and finishing.

The project's prefabricated bathroom units (PBU) use lightweight concrete walls with structural floor slabs, which were designed as part of the towers' flat slab system to avoid ugly detailing at the joints.

The rebar of the PBU had to be tied with the rebar for the flat slab before the floor slab of that storey can be cast. The main contractor had to hoist the PBU while tying the rebar and cast the concrete for the slab within the same day to reduce movements of the parts. The PBU carcasses were fabricated in Malaysia, while the waterproofing and finishing were done on site before hoisting. As such, the timing of the PBUs' arrival on site had to be closely coordinated to prevent construction delays.

PROJECT DATA

Project Name
The Criterion EC

Location
Yishun Street 51, Singapore

Completion Date
26 February 2018 (TOP)

Site Area
17,940.2 square metres

Building Height
13 storeys; 56 metres

Number of Units
505

Developer
Island Glades Developments (City Developments–TID Pte Ltd JV)

Architecture Firm
Consortium 168 Architects Pte Ltd

Project Interior Design
SM Studio Pte Ltd

Civil & Structural Engineer
KTP Consultants Pte Ltd

MEP Engineer
United Project Consultants Pte Ltd

Quantity Surveyor
Davis Langdon KPK (Singapore) Pte Ltd

Landscape Architect
Tinderbox Pte Ltd

Main Contractor
Nakano Singapore (Pte) Ltd

Images
Pinckers Pte Ltd

A display of dominant white with black clean-cut lines

The open-concept classrooms with large cross-ventilating windows

SMK ST FRANCIS CONVENT (M), SABAH

Educational establishments are inevitably utilitarian, but that's where the norm ends with the design approach for this new school block.

SMK St Francis Convent (M) is an all-girls secondary school and one of the oldest schools in Kota Kinabalu, Sabah. What started as a mission school now needed to be expanded to accommodate the burgeoning student population of 800, which comprise a harmonious mix of races and religions.

And for that, the Diocese of Kota Kinabalu tasked Arkitek PV + Tang to materialise the brief, based on compulsory guidelines from the Ministry of Education and a budget gleaned gradually over the course of 20 years from multiple sources of government assistance and public funding.

The former school block was also plagued by constant termite issues, hence the new building needed to stand the test of time.

The architects felt from the first get-go that the new school needed to adhere to sensible and common-sense methods of energy-saving. Pared-down and simplified, the building is oriented to the north and south to shield the entire block from the glaring sun as much as possible. The classrooms have an open concept and large cross-ventilating windows, while the project is outfitted with LED lighting for lower energy consumption.

The circulation is strategically planned to minimise the travel distance, while concurrently creating a central open atrium that serves as a gathering space, without needing to build a single function room.

The restraint exercised in the design lends to the air of simplicity and meets the practical needs of the school, yet still evoking evident beauty in the meditative quality of repetition.

Utilitarian it might be, but uninteresting it most certainly is not.

The central open atrium serves as a gathering space

Beauty in rhythmic repetition

PROJECT DATA

Project Name
SMK St Francis Convent (M), Sabah

Location
Jalan Kebajikan, Kota Kinabalu, Sabah, Malaysia

Completion Date
November 2018

Site Area
10,330 square metres

Gross Floor Area
1,660 square metres

Building Height
4 storeys

Number of Classrooms
22

Client
SMK St Francis Convent (M)

Architecture Firm
Arkitek PV + Tang Sdn Bhd

Principal Architect
Ar Patrick Vun Nyuk Pin

Civil & Structural Engineer
PY Konsep Perunding Sdn Bhd

Mechanical & Electrical Engineer
Power Project Consultant Sdn Bhd

Quantity Surveyor
Jurukos Raihan Sdn Bhd

Landscape Architect
Arkitek PV + Tang Sdn Bhd

Main Contractor
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ENCORE MELAKA THEATRE

The Encore Melaka theatre has become an icon of the Melaka skyline, standing tall beside the Straits of Melaka as a new tourism–cultural integrated development from Yong Tai Bhd. The theatre design represents a journey through time and space—embodying cloud and sea, movement and serenity, East and West.

Designed by chief architect Wang Ge, from the Beijing Institute of Architectural Design, its geometric façade has concaved arcs and looks like it's wrapped in porcelain-like scales. The 400,000 pieces of aluminium composite panels—used instead of porcelain due to its lighter weight and durability—combine with hundreds of thousands of LED lights to reflect light from the ever-changing and vibrant Melaka sky.

An organic canopy entrance leads to a foyer covered with porcelain tiles in different shades of blue, a metaphor for Melaka's multiculturalism.

The theatre is purpose built for the Encore Melaka performance, the first Impression Series staged outside of China, directed by Wang Chaoge. The production involves more than 200 Malaysian performers and tells the story of Melaka's growth through multilingual song and dance and intricate theatre props.

As Southeast Asia's largest performing arts theatre, the 2,000-seater features a 360-degree rotating audience platform that faces a 240-metre-long stage with multiple built-in hydraulic parts. State-of-the-art technology, such as the 3D projection mapping, bring the audience through different eras.

Concaved arcs crown the theatre

Multiple stages, digital mapping technology and a rotating platform to present the story of Melaka

CHALLENGES

One of the main initial obstacles faced in this project was sourcing for funds. Local banks were concerned about the theatre's commercial viability and requested for feasibility studies and valuation reports, but as this was the first of its kind in Malaysia and Southeast Asia, there was no comparable project to refer to.

Then when a bank in China agreed to extend a line, the signing of the loan agreement, which was supposed to happened on 9 March 2014 was postponed due to the MH370 tragedy. After these setbacks, the Encore Melaka theatre finally became a reality five years later.

The main technical challenge was to bring in the rotating auditorium technology. A 1-to-1 scale replica had to be done in China to ensure that the system could function properly before being sent over to Malaysia. It underwent stringent testing to make sure all technical aspects were met, then it was dismantled and shipped to Malaysia for reassembly.

Another technical issue was the launching of the longest span steel roof truss in Malaysia. A 1,250-tonne crawler crane was used to lift all 12 roof trusses, with wind speed being a key factor in determining a successful launch.

The simple and classy geometric façade

Some 400,000 aluminium composite panels wrap the building

A new icon of the Melaka skyline

PROJECT DATA

Project Name
Encore Melaka Theatre

Location
3, Jalan KSB – Impression 8, Impression City @ Kota Syahbandar, Melaka, Malaysia

Completion Date
June 2018

Site Area
15 acres

Gross Floor Area
42,000 square metres

Building Height
4.5 storeys

Number of Seats
2,000

Developer
PTS Impression Sdn Bhd

Design Consultant
Beijing Institute of Architectural Design (BIAD)

Designer
Wang Ge

Architecture Firm
Asima Architects Sdn Bhd

Principal Architects
Leow Aik Boon; Lee Ren Ying

Interior Design Firms
IDeas Makeover Sdn Bhd; Idea Workshop Sdn Bhd; ensemble studio

External Infra Engineer
Jurutera Perunding SPCE Sdn Bhd

Structural Engineer
TDC Engineering Consultants Sdn Bhd

Mechanical & Electrical Engineer
EC Engineering Consultancy Sdn Bhd

Quantity Surveyor
JUBM Sdn Bhd

Land Surveyor
Jurukur Prima

Landscape Architect
HODA Design Sdn Bhd

Main Contractor
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V ON SHENTON, SINGAPORE

For many years, following its completion in 1973, the former UIC Building—located along Shenton Way—dominated the city skyline as Singapore's tallest tower.

Following the rejuvenation of this stretch of buildings in the heart of the central business district, the UIC Building has been redeveloped into a striking new landmark, known as V on Shenton.

The twin tower project comprises a 23-storey Grade-A office building and a 53-storey residential tower that sit upon a plinth.

The dual programming of the building is highlighted through its massing. The office tower responds to the scale of the surrounding buildings and to the street, while the residential tower rises up to distinguish itself from its neighbours.

PLAY OF HEXAGONS

The steel substructure is wrapped in a distinctive honeycomb façade, augmented by a series of sky gardens that offer panoramic city views.

The continuous envelope of protruding and receding hexagons adds texture and cohesion to the building, while reflecting light and pocketing shade.

A play of varied hexagonal forms and configurations

The public café next to the office tower lobby

The play of varied forms and configurations differ according to the programmatic function and position. The office tower is based on a curtain wall module and an optimised number of panel types, recombined to create a signature pattern, while the residential façade is based on the stacks of unit types, combining modules with systematic material variations.

Thin blue 'chamfers' outline the entire project to visually unify and frame the language of the architecture, most visibly when lit up at night.

PRIVATE & PUBLIC SPACES

The development includes three fully integrated sky gardens—offering 360-degree panoramic views of Singapore, fresh air and a green refuge in the city, along with a variety of amenities and communal spaces. The most ample and diverse of the three sky gardens covers the entire eighth storey.

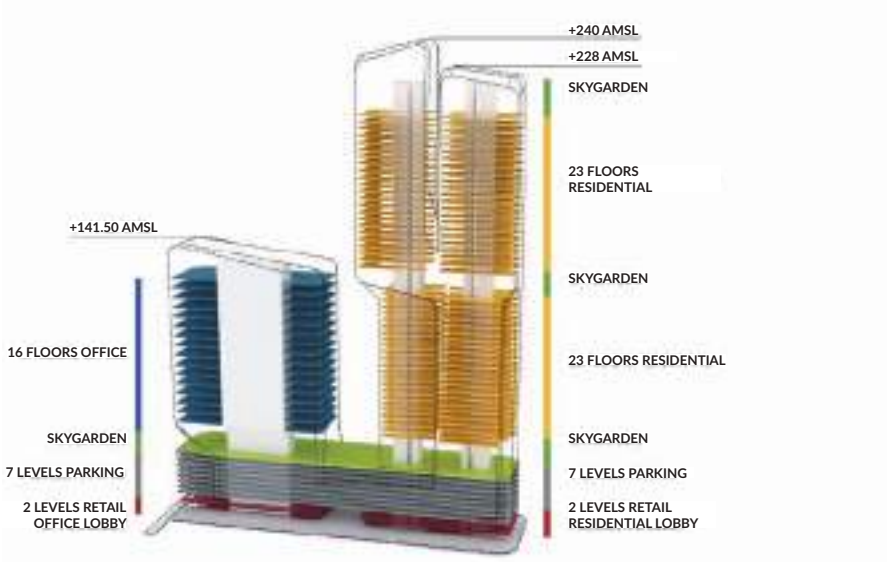
Above the sky garden on the 34th level of the residential tower, the unit mix changes with a subtle display of its split core. This separation also exhibits the natural ventilation concept of the tower, which is further effected through ventilation slots next to the cores.

The 510 residential units include two- to three-bedroom apartments and penthouses, with views of city and sea. The volumetric balconies add depth to the façade.

The office tower also includes two storeys of retail space and parking.

On ground level, next to the office tower lobby, a large café forms the central meeting point for the public areas. Stainless steel lines inlaid into the floor, lines of light in the ceilings, and vertical lamellas-clad car ramps are some of the wayfinding guides in the common areas for visitors.

The chamfers that frame the buildings light up at night



Concept phase stacking

One of the Sky Gardens

PROJECT DATA

Project Name
V on Shenton

Location
5, Shenton Way,
UIC Building, Singapore

Completion Date
October 2017

Site Area
6,778.06 square metres

Gross Floor Area
85,507 square metres

Building Height
Residential: 54 storeys;
237 metres
Office: 23 storeys; 123 metres

Developer
UIC Investments (Properties)
Pte Ltd

Design Consultant
UNStudio

Principal Design Consultant
Ben van Berkel; Astrid Piber

Executive Architect
Architects 61 Pte Ltd

Principal Architect (QP)
Michael Ngu

Landscape Architect
COEN Design International
Pte Ltd

Green Building Consultant
Aurecon Singapore (Pte) Ltd

Façade & Curtain Wall
Aurecon Singapore (Pte) Ltd

Civil & Structural Engineer
DE Consultants (S) Pte Ltd

Mechanical & Electrical Engineer
J. Roger Preston (S) Pte Ltd

Quantity Surveyor
Davis Langdon KPK
(Singapore) Pte Ltd

Lighting Consultant
ONG&ONG Pte Ltd

Wayfinding & Signage
Square Peg Design Asia Pte Ltd

Main Contractor
Samsung C&T Singapore Pte Ltd

Façade Subcontractor
Jangho Curtain Wall Singapore
Pte Ltd

Images
Darren Soh

Seamless interface between the covered public space, ground-level retail and park

TANJONG PAGAR CENTRE

Located at the intersection of the historic Chinatown area and the central business district (CBD) in Tanjong Pagar, the design of the tallest building in Singapore needed to address the transitional scale and fabric of the city.

With a simple and elegant massing that tapers as it reaches upwards and a strong setback two-thirds of the way up, the profile of the complex resembles the Chinese symbols for 'people' and 'entry', when viewed from the west and east, respectively.

On the eastern half of the site is the 290-metre office and residential tower, offering 38 storeys of Grade A office space (Guoco Tower), with luxury residential units above.

To the west is a 20-storey mid-rise tower—scaled to accommodate the low-rise conservation Chinatown district—housing a luxury business hotel and its amenities, including a landscaped terrace and pool deck overlooking the redesigned Tanjong Pagar City Park.

The six-storey podium contains carparks, retail, restaurants and entertainment. The public component includes the City Room, which features public art and outdoor performance areas, ground-level retail and an underground pedestrian network that connects to the existing MRT station.

"The design for Tanjong Pagar Centre balances diverse functional requirements with a strong, unified building profile that will add an iconic presence to Singapore's skyline," says Mustafa K. Abadan, design partner at SOM.

INTEGRATED FUNCTIONS

One of the biggest challenges for this mixed-use complex was to reconcile the residential building core with that of the office building, while still maintaining an efficient office floor plate.

The office floor and envelope are quite tight, whereas the residential floors are more porous with balconies and operable windows for fresh air circulation. The tapered profile, capped with a crenelated crown, was able to combine these two different languages on the façade as an integrated whole, while accentuating its verticality.

A balance of below and above ground carparking—combined with screens that block the view of parked cars yet allow natural ventilation—addressed both aesthetic and commercial concerns about the carpark design.

BUILDABILITY

With its scale and location within a dense urban environment, the project was constructed using a full top-down approach, where the superstructure was constructed within a robust design of temporary supports and well-integrated sequence of works. This minimised movements to the MRT station structure and cracks to the nearby conservation shophouses, while streamlining the basement construction processes, resulting in time and cost savings.

Structural steel was used instead of reinforced concrete at both podium and basement levels of the office tower for speed. The savings in self-weight meant that more floors could be supported by the kingposts during the top-down construction, allowing the superstructure to be built to 15 storeys and the core wall to 18 storeys. Thus, despite the challenges of a tight basement, the podium's changing floor layout and critical structural elements, the construction of the superstructure could progress unimpeded.

The use of prefabricated structural steel results in less impact to the environment and reduced total workload. However, the use of steel in the basement posed challenges such as movement of materials and a re-rating requirement. To counter that, two 12-metre-long openings were created near the core wall to allow the lowering of beams to the respective basement levels, while solutions were found to protect the beams and slab decking for up to four hours of exposure to fire.

SUSTAINABILITY

The development uses passive technologies as part of its sustainability efforts, which have achieved both Green Mark and LEED platinum status.

Both towers feature a high-performance curtain wall that provides shading and reduces energy use, while unifying the various components of the mixed-use project. The neutral grey-blue double silver low-E glass reflects the changing lighting of the day.

Rooftop garden with cantilevered glass viewing platforms

Office lobby

Highest residential units in the city

Aerial view

Residences lobby lounge

Horizontal reveals and fins on the north and south sides provide shading and help scale the wide proportions of the building, while vertical fins on the east and west faces accentuate the building profile and provide added glare protection.

Rooftop gardens at the hotel and residences, along with the 150,000-square-foot landscaped urban park, provide the right balance to the dense urban centre. The City Room in the middle of the park has a 16-metre-high solar-integrated glass roof that permits soft light to filter through while capturing the sun's energy above. The BIPV panels also help cool the public space and promote air movement from east to west.

TRANSIT-ORIENTED

Integration with the existing MRT station required close collaboration with the Land Transport Authority to ensure smooth operations during construction.

Taking the site's soil geology into account, the design consultants proposed a three-level basement structure to be connected to the station structure. This retaining wall system allowed the contractor to work on the main building structures independent of the connection to the MRT station, minimising disruption.

The engineers proposed to keep the base slab at the same level as the MRT structure for ease of connectivity and to avoid overstressing the existing foundation. This saved 30 per cent of the potential costs incurred by mobilising soil as foundation and cut down the number of piles needed to support the structure.

Two newly-designed MRT entrances on the eastern and western sides of the city park enhance access to the metro and the centre's underground network—with its F&B and retail offerings—while provisions have been made for a possible connection to the north and for future development.

PROJECT DATA

Project Name
Tanjong Pagar Centre

Location
1, Wallich Street, Singapore

Completion Date
June 2018

Site Area
1.5 hectares

Gross Floor Area
157,609 square metres

Building Height
64 storeys; 290 metres

Developer
Perfect Eagle Pte Ltd (GuocoLand Singapore)

Design Consultant
Skidmore, Owings & Merrill LLP (SOM)

Executive Architect
Architects 61 Pte Ltd

Principal Architect (QP)
Michael Ngu

Project Head
Kevin Lim

Interior Design Firm
Wilson Associates (Wallich & Sofitel)

Civil & Structural Engineer
Arup Singapore Pte Ltd

MEP Engineer
Meinhardt (Singapore) Pte Ltd

Quantity Surveyor
Arcadis Singapore Pte Ltd

Lighting
Lighting Planners Associates (S) Pte Ltd (main structure); Meinhardt Light Studio (hotel interiors)

Landscape Architect
Cicada Pte Ltd

Green Building Consultant
Arup Singapore Pte Ltd

Main Contractor
Samsung C&T Singapore Pte Ltd

Interior Fit-Out
Shanghai Chong Kee Furniture and Construction Pte Ltd (hotel public areas); Star Decor & Construction Pte Ltd (hotel rooms)

Images
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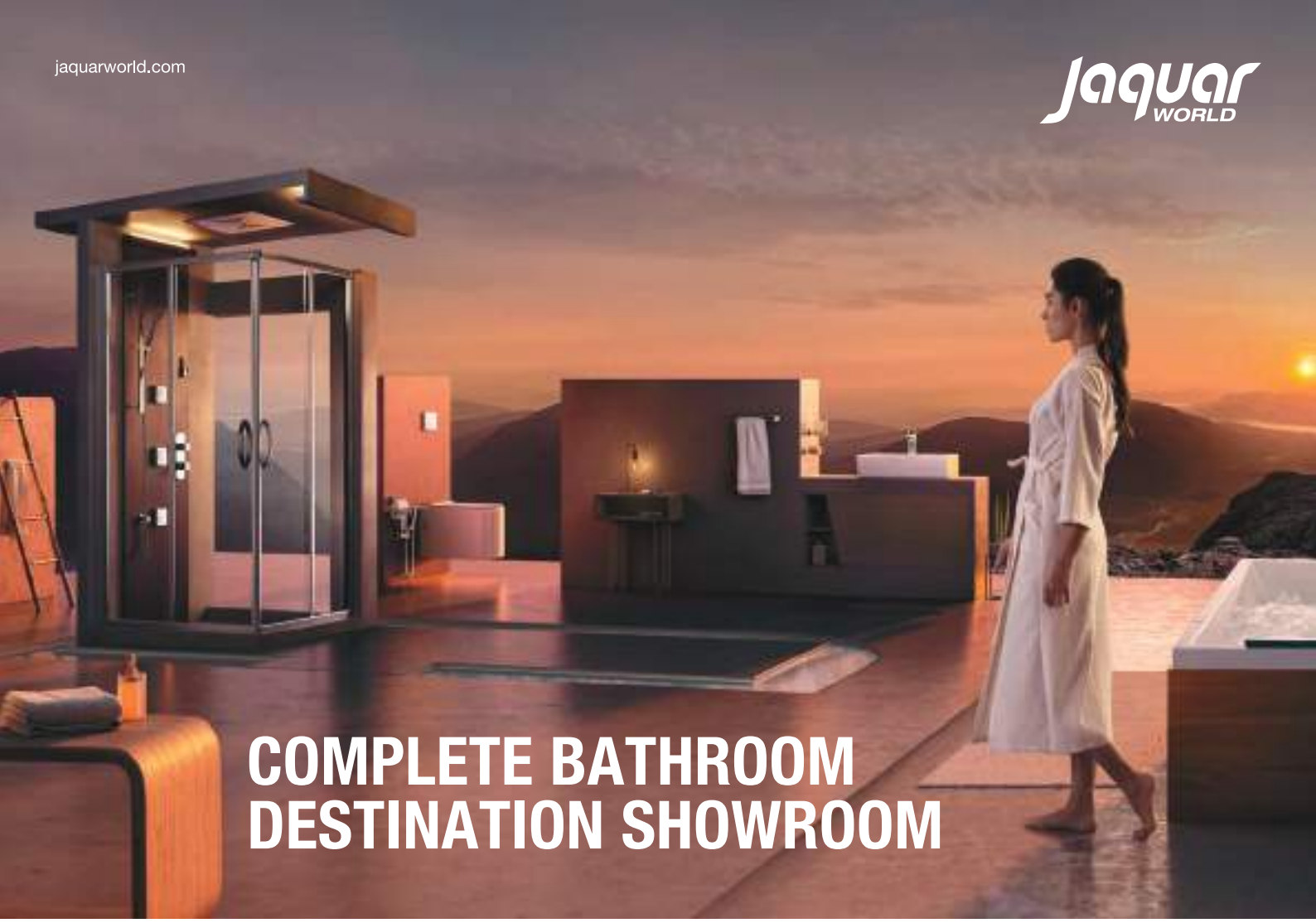

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CREAM OFFICE

The Construction Research Institute Malaysia (CREAM) wanted a new 10,000-square-foot workspace without the stuffy formal environment often associated with research institutes.

The result is a warm and welcoming space with ample daylight and city views.

The windows in this building are small compared to other city centre offices, but they open up to great views of the Kuala Lumpur skyline. Hence, the workspaces are arranged along the periphery of the existing central core and adjusted according to the wall opening positions.

The research office was designed and built on a very tight budget in a total of eight weeks, made possible by the modularity in design and materiality, which facilitated ease and speed of the production of custom-built items.

The use of natural materials, such as rubberwood, throughout this space helps create a cohesive and cosy ambience. Rubberwood is a more affordable and eco-friendlier source of timber compared with other hardwood, as rubber trees grow faster and are often 'leftovers' from plantations that have ceased producing rubber sap.

In the entrance lobby, rubberwood thin slats line the walls and ceiling, lending a sense of depth to the space that draws one in.

The workspace partitions are crafted from industrial polycarbonate sheets and acoustic fabric panels framed with laminated rubberwood. The semi-translucent polycarbonate panels provide researchers with privacy, without cutting off visual connection completely.

Rubberwood-framed lobby

Corridor leading to workstations

Polycarbonate partitions offer privacy with visual connection

Library with painted mild steel shelves

Workspaces are arranged along windows for natural light and views

PROJECT DATA

Project Name
Construction Research Institute Malaysia (CREAM) Office

Location
Level 29, Sunway Putra Tower, 100, Jalan Putra, Kuala Lumpur, Malaysia

Completion
March 2017

Gross Floor Area
10,000 square foot

Client
Construction Research Institute Malaysia (CREAM)

Interior Designer
Eleena Jamil Architect

Principal Designer
Eleena Jamil

Mechanical & Electrical Engineer
RE Tech Consulting Engineers Sdn Bhd

Interior Fit-Out Contractor
Grand Teknik Bina Sdn Bhd

Images
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Large columns and brick arches create more intimate private dining spaces

Large theatre kitchen

WILD FLOUR RESTAURANT

First opened seven years ago, the flagship Wild Flour Restaurant in the Net Lima Building, in Bonifacio Global City, Philippines, has been renovated and expanded.

The refurbished store now incorporates the Farmacy, an ice cream and soda fountain outlet by the same owners, making it one of the biggest restaurants in the city.

The dining area has been extended and combined with the outdoor seating to accommodate more than 100 guests. A large theatre kitchen caters for the enlarged capacity.

In contrast to the modern glass-clad Net Lima building, the restaurant adopts a more relaxing and welcoming look, where co-workers, family and friends can gather.

The existing large columns in the space are incorporated into the design to create more intimate private dining areas, enhanced with brick arches to tie the overall look together.

As part of its sustainability efforts, the restaurant is refurbished using locally-sourced materials, such as bricks and floor tiles, and recycled wood planks.

A relaxing and welcoming dining ambience

Main dining area

Pastry counter

Private dining room

PROJECT DATA

Project Name
Wild Flour Restaurant

Location
Net Lima Building, BGC, Philippines

Completion Date
October 2018

Gross Floor Area
360 square metres

Client/Owner
Wildflour Café + Bakery Co

Interior Design Firm
Larawan Ink Management Consultancy

Principal Designer
Lara Fernandez Barrios

Interior Fit-Out Contractor
Direction Wood and Rattan Center

Images
Larawan Ink Management Consultancy

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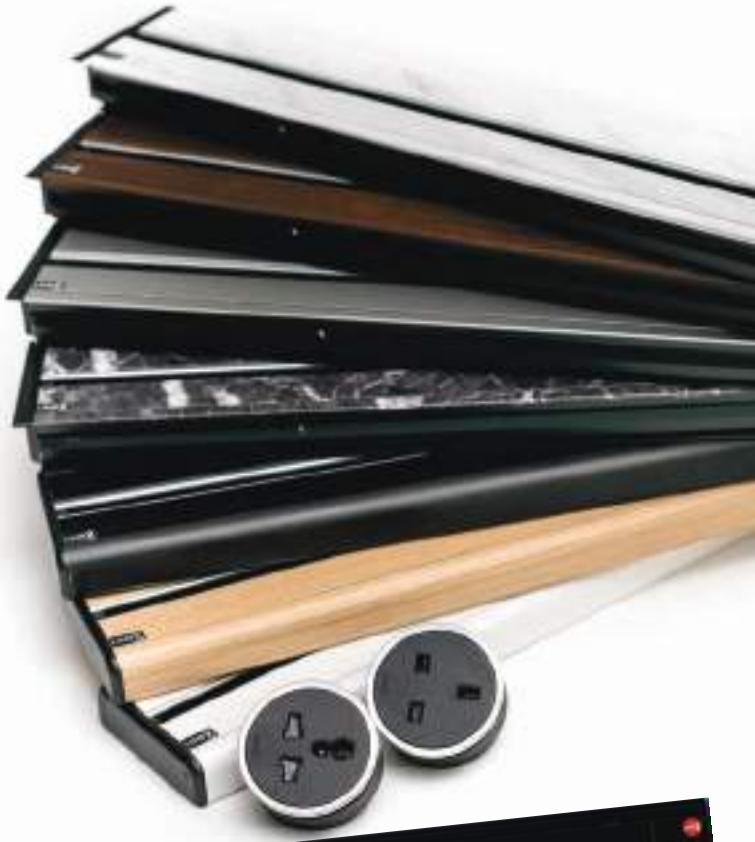

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AGILE BUKIT BINTANG

A 60-storey residential development in Kuala Lumpur's CBD

PROJECT TITLE	PROJECT TYPE	LOCATION	DEVELOPER	ARCHITECT/ CONSULTANT	CONSTRUCTION START	ESTIMATED PROJECT VALUE (RM 'MILLION)
Agile Bukit Bintang	Serviced apartments; SOVO; shops	Kuala Lumpur	Offshore Triangle Sdn Bhd (Tropicana Bukit Bintang Development Sdn Bhd and Agile Real Estate Development (M) Sdn Bhd JV)	VERITAS Architects Sdn Bhd; DP Architects Pte Ltd – Singapore	Q2 2019	522
Atwater	Apartments; offices	Section 13, Petaling Jaya, Selangor	Paramount Property Development Sdn Bhd	Ong & Ong 360 Consultancy Sdn Bhd	Q2 2019	260
Canopy By Hilton	Hotel	Kuala Lumpur	UDA Holdings Bhd, EcoWorld Development Sdn Bhd, and Employees Provident Fund (EPF) JV	GDP Architects Sdn Bhd	Q2 2019	287
Cubic Botanical @ Pantai Dalam	Apartments; shops	Kuala Lumpur	Ancubic Puchong Sdn Bhd (subsidiary of Ancubic Holdings)	Wang HC Architect	Q2 2019	200
Euro-Atlantic Factory	Industrial	Mukim Batu, Kuala Lumpur	Euro-Atlantic Sdn Bhd	KSKA Arkitek Sdn Bhd	Q2 2019	10
Melalin Bay Residence	Residential	Tuaran, Sabah	Uni Mix Sdn Bhd (subsidiary of Pristana Sdn Bhd)	Paul Lau Architect	Q2 2019	13
Menara Dayabumi: Phase 3	Hotel; shops; offices	Jalan Sultan Hishamuddin, Kuala Lumpur	KLCC Projeks Sdn Bhd	Arquitectonica International Corporation; NRY Architects Sdn Bhd	Q2 2019	250
Petrajaya Hospital	Health	Petrajaya, Kuching, Sarawak	Jabatan Kerja Raya Malaysia, Cawangan Kerja Kesihatan	W & W Architects; SJ Loong Architect	Q2 2019	495
Pinji Hospital	Health	Ipoh, Perak	Pinji Hospital Sdn Bhd (subsidiary of Taiko Properties Sdn Bhd)	Teknireka Architects Sdn Bhd	Q2 2019	40
Riveria City (Phase 1)	SOVO	Brickfields, Kuala Lumpur	Titijaya Land Bhd and Bina Puri Construction JV	Arkitek KDI Sdn Bhd	Q2 2019	80

Source: BCI Asia Research

SINGAPORE

KENT RIDGE HILL RESIDENCES

Five-storey apartment blocks and landed homes

MAYFAIR GARDENS

Four condominium blocks with 215 units

PROJECT TITLE	PROJECT TYPE	LOCATION	DEVELOPER	ARCHITECT/ CONSULTANT	CONSTRUCTION START	ESTIMATED PROJECT VALUE (SGD 'MILLION)
Catering Factory	Industrial	30B, Quality Road	Neo Group Pte Ltd	ID Architects Pte Ltd	March 2019	15
Central Boulevard Towers	Mixed Use	Marina Bay of District 01	Wealthy Link Pte Ltd	Architects 61 Pte Ltd	March 2019	750
Dunearn 386	Residential	386, Dunearn Road	RH Central (subsidiary of Roxy-Pacific)	RSP Architects Planners & Engineers Pte Ltd	March 2019	15
Fourth Avenue Residences	Residential	District 10, Bukit Timah	Allgreen Properties Ltd	RSP Architects Planners & Engineers Pte Ltd	March 2019	150
Fraser Residence Promenade	Mixed Use	Jiak Kim Street	Frasers Property	P & T Consultants Pte Ltd	March 2019	250
General Industrial Building	Industrial	Tuas Bay Close	Soilbuild Group Holdings Ltd	AC Consortium Pte Ltd	March 2019	70
Kent Ridge Hill Residences	Residential	South Buona Vista Road, Pasir Panjang (District 05)	Oxley Spinel Pte Ltd	ADDP Architects LLP	March 2019	100
Mayfair Gardens	Residential	Rifle Range Road	Citrine Property (Oxley Holdings)	DP Architects Pte Ltd	March 2019	70
Parc Esta	Residential	Sims Avenue	MCL Land (Everbright) Pte Ltd	P & T Consultants Pte Ltd	March 2019	300
Petit Jervois	Residential	33, Jervois Road	Jerwyn Pte Ltd	RT + Q Architects Pte Ltd	March 2019	15

Source: BCI Asia Research

Designed for a 100 per cent green area replacement

SURBANA JURONG CAMPUS

When completed in 2021, this development will house the global headquarters of Surbana Jurong, an urban and infrastructure consultancy firm.

The campus, situated within the Jurong Innovation District in Singapore, will serve as the Centre of Excellence for Innovation, facilitating closer collaboration among employees and global partners.

It will be a living lab with dedicated spaces for research and testing of new ideas, including solutions developed by the SJ-NTU Corporate Lab—a joint corporate laboratory set up by Surbana Jurong, Nanyang Technological University, Singapore, and the National Research Foundation Singapore. It will also house one of the largest interactive virtual reality halls in Singapore for up to 40 users.

Integrating with the Jurong Eco-Garden, the campus' biophilic design aims to connect users and visitors to nature, while preserving as much greenery as possible.

Public areas, such as the central spine, multipurpose hall, gallery, retail and F&B outlets, add vibrancy and foster a sense of community. It is connected to a future MRT station via the mobility corridor, part of Singapore's Round Island Route, and is equipped with amenities such as electric vehicle charging station and bicycle parking.

DESIGN & CONSTRUCTION

Designed by Safdie Surbana Jurong—a partnership between Safdie Architects and Surbana Jurong—the campus is envisioned as a showcase of a sustainable, people-centric and future-ready workplace.

The biophilic design aims to connect users and visitors to nature

The project also provides an opportunity for Surbana Jurong's own multi-disciplinary team of experts to undertake the entire development from start to end.

Contractors are engaged right from the design stage, allowing for innovation and inclusion of labour-efficiency technology during construction. Digital technologies such as design-optimisation computational methods, immersive virtual reality systems and drones for visualisation are also used.

The campus is one of the first non-residential buildings of this scale in Singapore to fully leverage on integrated digital delivery (IDD), with the use of end-to-end building information modelling (BIM). The construction process also adopts the Design for Manufacturing and Assembly (DfMA) approach, with precast walls, columns, beams and planks, as well as prefabricated MEP systems.

A combination of various structural systems are used for efficiency and functionality. These structures consist of precast concrete for the main blocks, post-tensioned concrete at strategic locations, structural steel for the central spine conjoining the east and west wings, and Ethylene tetrafluoroethylene (ETFE) roof supported by cable trusses at certain areas. A Vierendeel truss system is used in the stepped eastern block façades, while a grid-shell structural system is used for the long-span cantilever canopy design at the entrance.

This 'super low energy building' will incorporate technologies such as smart lighting control, an underfloor air-distribution system, and predictive smart building control.

Various structural systems are used for efficiency and functionality

PROJECT DATA

Project Name
Surbana Jurong Campus

Location
Jurong Innovation District, Singapore

Status of Construction
Site works commenced

Expected Completion Date
2021

Site Area
28,699.6 square metres

Gross Floor Area
68,915 square metres

Developer
Surbana Jurong Capital

Group Chief Executive Officer
Wong Heang Fine

Architecture Firm
Surbana Jurong Consultants Pte Ltd

Principal Design Consultant
Safdie Architects

Civil & Structural Engineer
KTP Consultants Pte Ltd
(a member of Surbana Jurong)

MEP Engineer
Surbana Jurong Consultants

Quantity Surveyor
Threesixty Cost Management Pte Ltd
(a member of Surbana Jurong)

Project Management
SIPM Consultants Pte Ltd
(a member of Surbana Jurong)

Lighting Consultant
Nipek Pte Ltd

Landscape Designer
PWP Landscape Inc

Landscape Architect
Surbana Jurong Consultants

Green Building Consultant
Surbana Jurong Consultants

Main Contractor
Boustead Projects E&C Pte Ltd

Images
Safdie Surbana Jurong

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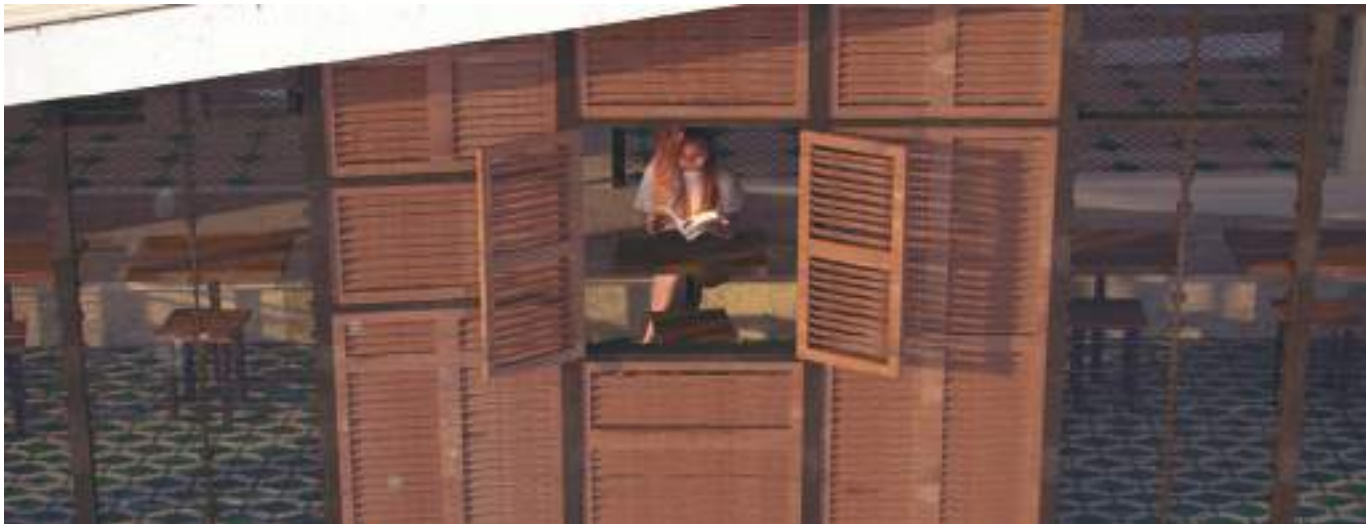
The library housed within three shop lots

COMMUNITY LIBRARY

This student project is sited within three shophouse lots in Kuala Lumpur's Chinatown, directly facing an Indian temple, with a local market at the rear and flanked by shop houses and restaurants.

The social demographics comprise students, locals and transient groups, namely tourists and white-collar workers. These urban dwellers seem to be 'locked up' behind grilles in their units for protection—even a religious altar is 'caged' to prevent theft. The area seems to have lost its community spirit and sense of place. The community library seeks to change that by providing a place to stop, relax and ponder.

By negotiating the tectonics and massing of built forms, grids are deformed via intersection of spaces and the creation of voids to stimulate passive contact among users. The spaces are arranged to capture the 'intangibles' of the site, the natural elements, sounds, colours and smells. All these are amplified and framed to make people appreciate and realise what they have missed in the hustle and bustle of city life.



Read with a view

A reading net in the library area for stack ventilation and visual connection

A pedestrian path punctures through the ground floor to create a passageway to lure passers-by. The main staircase circulation is emphasised to intrigue those on the street level with its deep visual permeability and invite them to explore and 'flip through' the layers of spaces within.

BUILDING PROGRAMME

These spaces are designed to form a self-sustaining village, where students, library users and the local market community forge a strong relationship.

A market space is located at the rear on the ground floor for small vendors. The event hall caters for large communal gatherings, such as festivals, lion dances and Hari Raya gatherings.

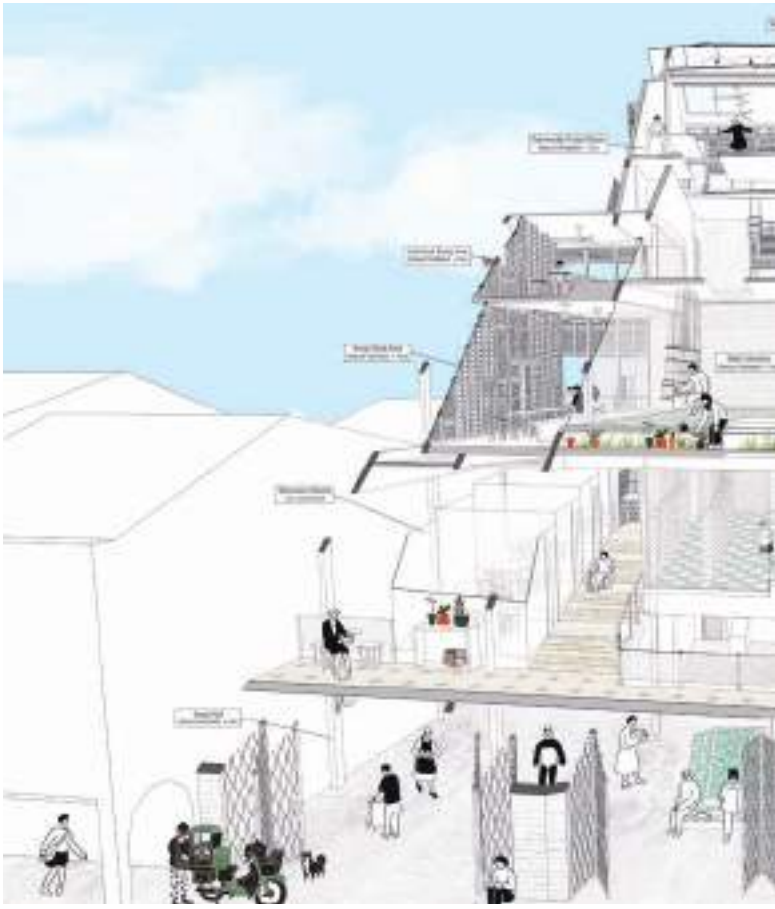
To cater to the out-of-town students studying nearby, there is student accommodation on the rear of the first floor, which faces the local market. On the same level, a semi-open reading area is carved for locals to hang out and read newspapers. The voids within (the atrium) and the voids without (the permeable walls) ensure that the ground and first floor are well-connected with visual and audio cues, so one can read while being immersed in the atmosphere of the local community.

Upon entering the second floor, the hustle and bustle of the street is traded for intimate private reading spaces, interspersed with pockets of garden for outdoor breaks. In the main collection area, there is a void with a reading net for stack ventilation and visual permeability.

A Maker's Space is housed on the third floor, where users can pick up life skills offered by NGOs and volunteer groups.

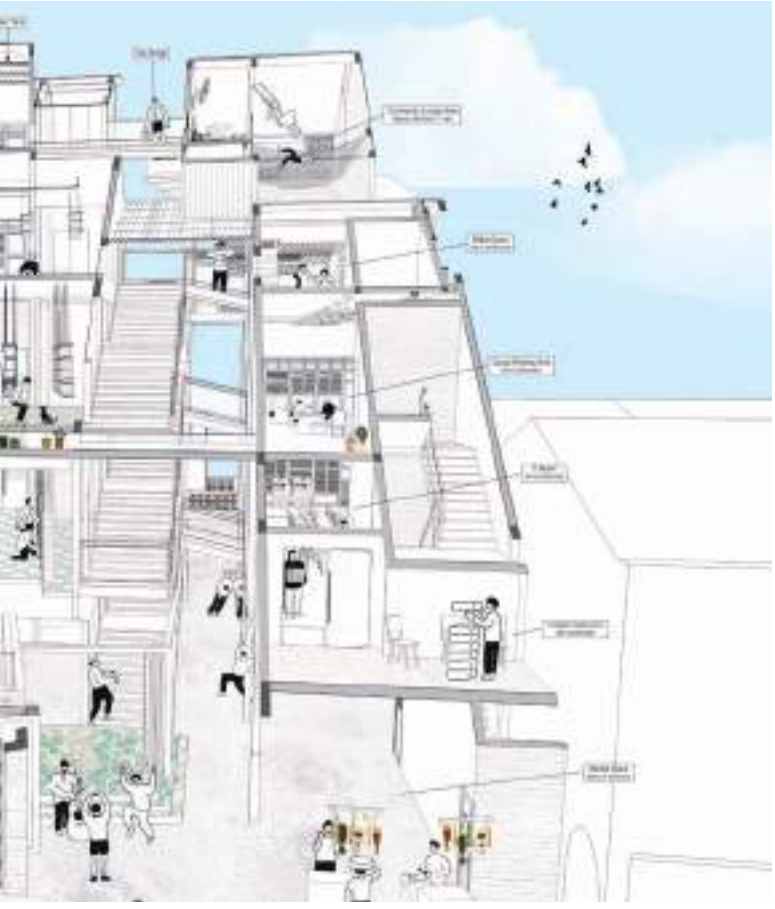
The heart of the library is located on the fourth floor, which includes a community lounge and project room linked by a sky bridge. The planning and execution of community activities happens here.

The library's roof-scape, when seen from above, reveals a collection of boxes, stacked and twisted to create movement and breathing spaces. These volumes are meant to encourage exploration and circulation, while capturing views, breaking the monotony of city life.



Sectional perspective

Back elevation



PROJECT DATA

Student Name
Tan Ling Rong

School
Taylor's University Lakeside Campus, Malaysia

Programme
Bachelor of Science (Hons) Architecture

Supervisor/Instructor
Ar Fadzwin Hashim

Project Name
Community Library

Project Year
2016

Location
Jalan Tun H.S. Lee, Kuala Lumpur, Malaysia

Site Area
500 square metres

Gross Floor Area
1,500 square metres

Building Height
5 storeys

Client/Owner
Local council

Images
Tan Ling Rong

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SKILLSFUTURE REST & LEARN

The average working adult's schedule is often too hectic and tiring for them to engage in further learning for self-improvement, especially if classes are located far away from them.

Hence, SkillsFuture Rest & Learn parasitic design is proposed. Located between residential buildings for the convenience of working adults, especially during the weekends, this design can be replicated in different areas with its Lego-like structure.

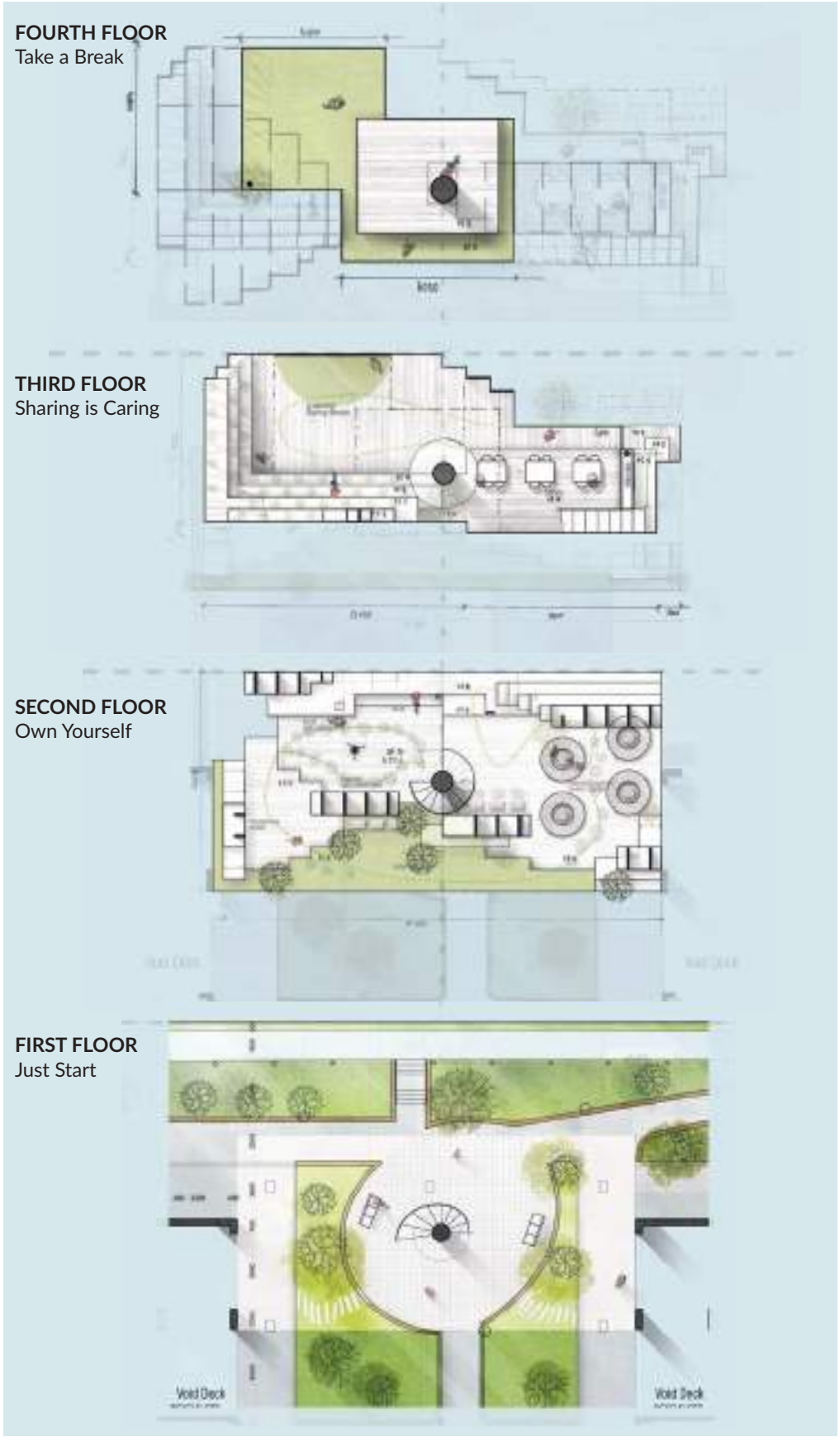
This space aims to inspire and encourage people to take actions for their dreams through an unconventional learning process within its four levels—Level 1 (Just Start), Level 2 (Own Yourself), Level 3 (Sharing is Caring), and Level 4 (Take a Break).

The 'tree' forms are inspired from the surrounding trees and HDBs. They are layered with a see-through effect for unobstructed views and sufficient sunlight, while providing structural support and steps for users to sit while resting or enjoying the scenery. The airy structure allows for wind to flow into the space, with surrounding greenery to lower the temperature.

The use of glass and thin metal structure, wood decking and recyclable items throughout—all of which can be sourced locally—achieve a clean setting for the concept. The slanted ceiling allows rainwater to flow down to the plants, creating a more sustainable environment.

Quiet space at the top floor for reflection and rest

Multifunctional spaces with push-down seating and soft white curtains for privacy



Building programme

PROJECT DATA

Student Name
Adora Lin Shiyun

School
Temasek Polytechnic

Programme
Diploma in Interior Architecture and Design

Supervisor/Instructor
Matthias Low

Project Name
SkillsFuture Rest & Learn

Project Year
2017

Location
Pasir Ris–Tampines Park Connector between HDB Block 121 & 122, Singapore

Building Height
4 storeys

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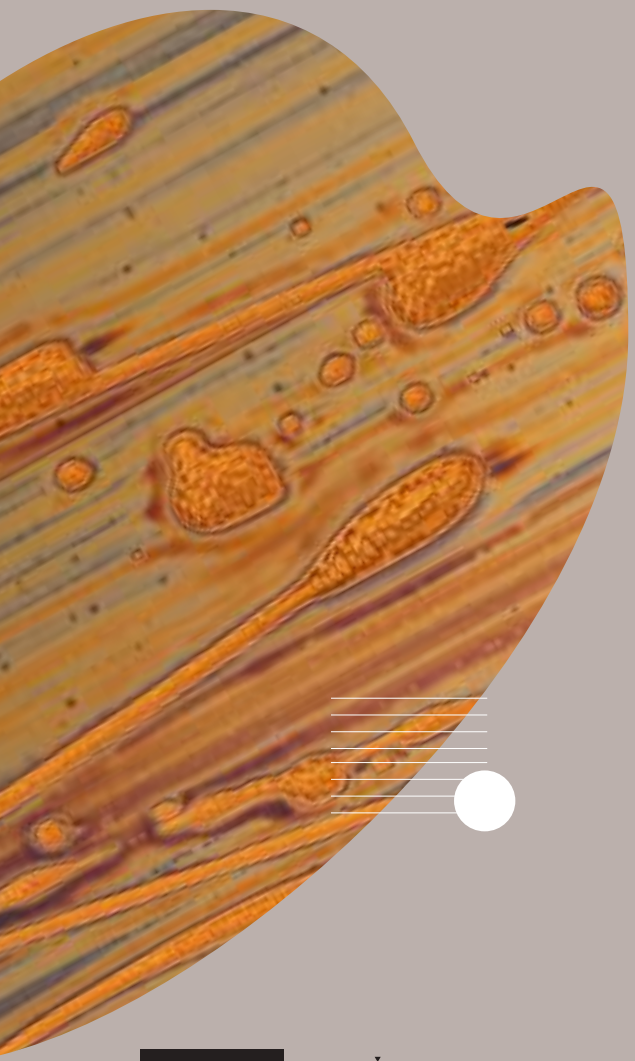

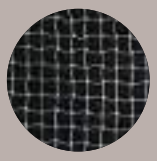

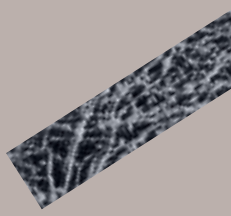

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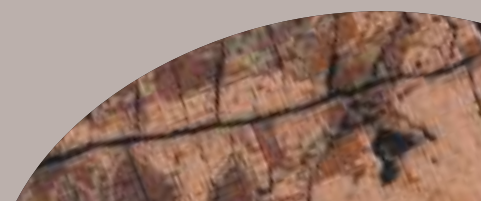

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