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## SIME DARBY IDEA HOUSE

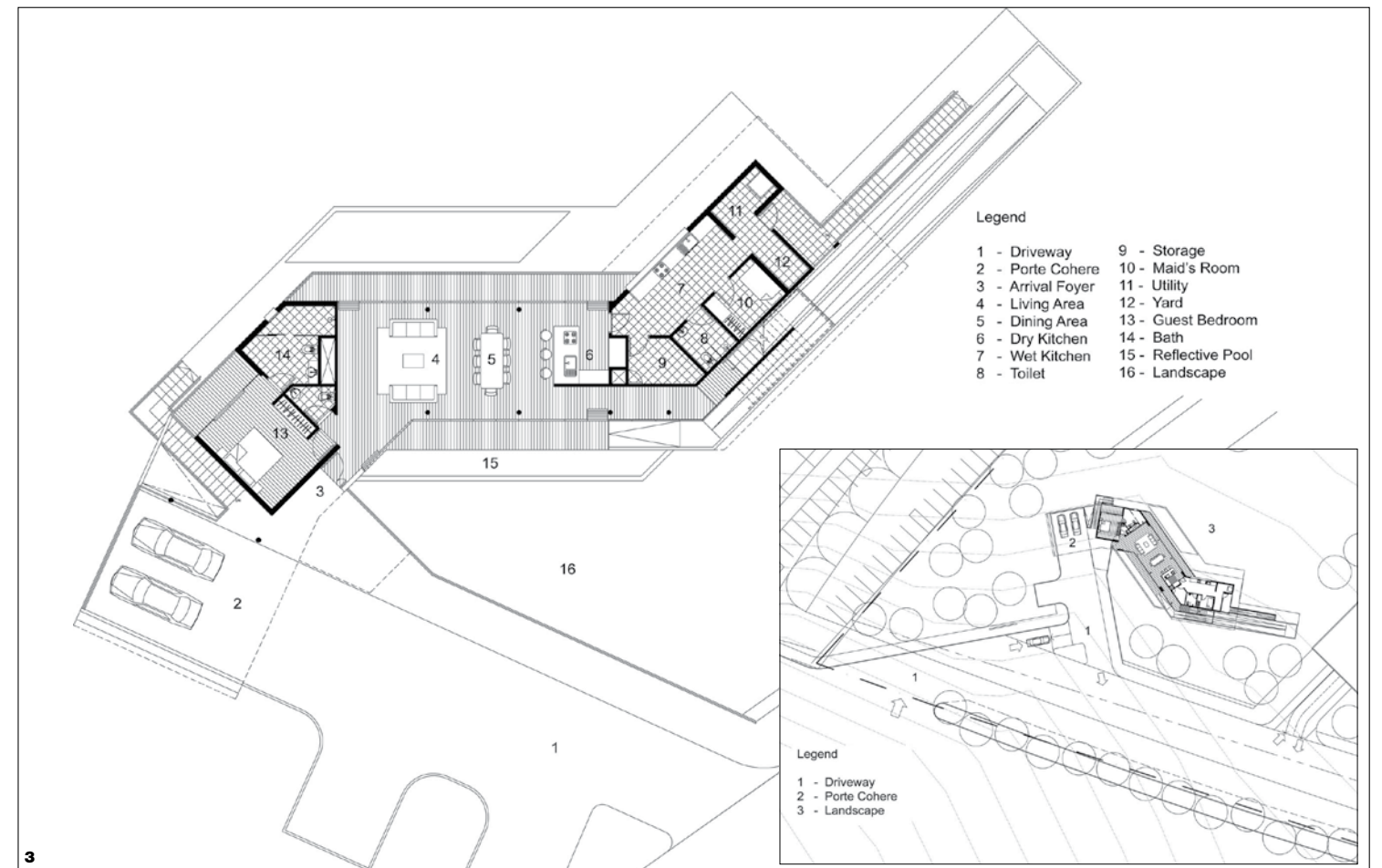
by Jason Pomeroy

With 30 million barrels of oil consumed on a daily basis (Opec, 2008) and the built environment accounting for 33 percent of the world's carbon emissions (World Green Building Council 2008; US Department of Energy, 2008), it is little surprise that our global society has awoken to the importance of preserving our one world for future generations. Collectively, governments have been instrumental in helping sustain our natural environment through broader initiatives such as the Kyoto protocol, whilst individually they have sought to establish an increasing plethora of regional rating systems (the UK's BREEAM, the USA's LEED, Australia's Green Star or, closer to home, Singapore's Green Mark and Malaysia's Green Building Index to name but a few) for implementation in the built environment. The global picture painted is one of a concerted effort in minimising waste and preserving our natural resources. Governments have led by example in the procurement of sustainable public works, particularly in the education, healthcare and civic realm sectors which, by inference and necessity, has seen the private sector follow suit.

### PROJECT BACKGROUND – THE GREEN CONSUMER

However, the private sector's embracing of the sustainability agenda has not just been because of governmental policy and legislation. The needs of the 'green consumer', awoken to the "inconvenient truth" of global warming and the depletion of natural resources, have become an important social classification for which the building industry needs to address. The green consumer's environmental, social and economic consciousness is manifest in the green buildings that they buy or rent. In adopting a more sustainable approach to design, developers are not only satisfying their own corporate social responsibilities in the preservation of the planet, but attracting the green consumer and corporation and increasingly reaping the economic benefits.

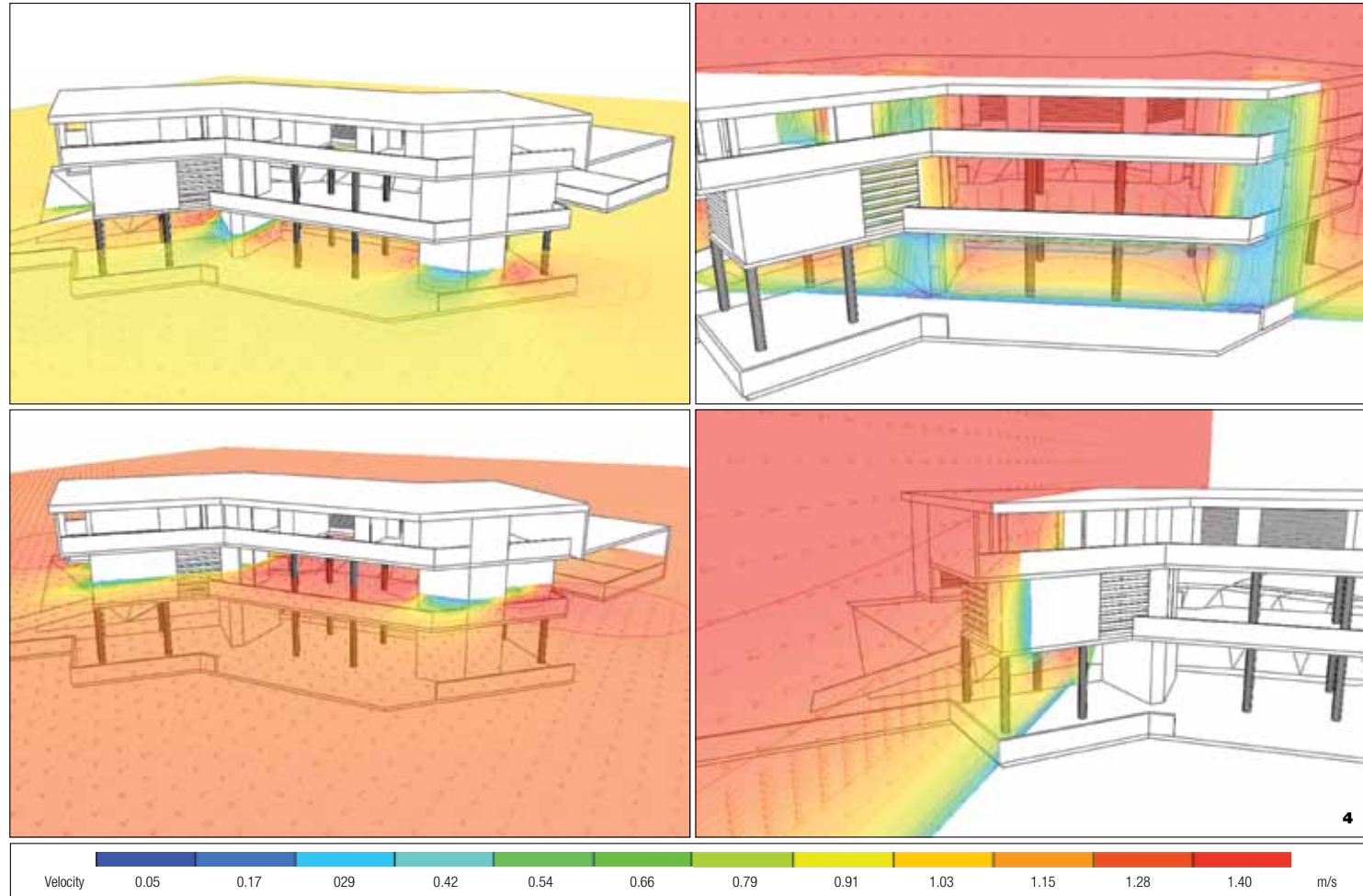
Sime Darby Property, Malaysia's largest property developer, approached us in August 2008 with the brief for the Idea House—a socially, economically, and environmentally responsive prototype dwelling that would provide an insight



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1 & 2 Perspective view  
3 Ground floor plan and site plan





into future tropical living. Conceived as a test bed for new ideas, the house would showcase the latest in sustainable architecture in the building's quest to become the first carbon zero residence in South East Asia. Sime Darby Property would systematically adopt particular strategies in the house in part or in entirety in their housing projects, demonstrating their commitment to furthering the cause of creating sustainable futures for future generations.

**TOPOGRAPHIC RESPONSIVENESS**

A close interaction between architect, landscape architect, infrastructural and civil engineers allowed for a co-ordinated response to the positioning of the house within the site. Exploiting the raised position on the site affords the Idea House views out over the landscape; it will be a highly visible beacon. The house responds similarly to the contours of the site's topography. It is cranked in order to follow such levels to create a contextual response that minimises the adverse effects of cutting and filling of the landscape. This preserves the site as much as possible for future generations.

**BUILDING FORM**

A study of the traditional Malay Kampung house was one of the key drivers. The Kampung house, in its socio-environmental responsiveness, provides deep overhangs that permit shade, weather protection and therefore opportunities for social interaction and habitation of the *anjung* and *serambi* verandah spaces. Open, permeable and flexible interior spaces with higher roof volumes allow for social and spatial flexibility, made comfortable by cross ventilation. Lifting the building on stilts maximises air flow, provides a clear separation between public and private, and ultimately creates a 'lightness of touch' to the ground through minimal groundwork penetrations. Such principles were incorporated into the Idea House, albeit that the building form pays little similarity to its vernacular cousin. Instead, a curvilinear ribbon forms floor, wall and roof in a sinuous fashion, defining space and at the same time creating a highly legible structure.

**LANDSCAPE**

An integrated approach to the landscape was sought that positioned the Idea House as a pavilion within the landscape, in a fashion not too dissimilar to the more rural setting of the Kampung house. As part of the Ideas Park, (a similar showcase for innovation and sustainability by Sime Darby) the design takes a cue from the curvilinear forms of the building as well as the topographical contours of the site. Integration between landscape and building is also established through a landscape scheme that is divided into garden sections that promote health, well-being, recreation, healing, agriculture, permaculture and the medicinal.

**GREY WATER AND WATER MANAGEMENT**

The design plans to capture 50 percent of the grey water from wash hand

basins and showers via a filtration system. The water can then be reused to flush the WC's, thus reducing water consumption and therefore utility costs. Water wastage is set to be further minimised by aerating the showers, resulting in less water being consumed by the room occupants. Based on an occupant using 133 litres of water per day, the aeration of showers could reduce consumption to 64 litres per day.

**GREEN ROOF AND RAINWATER CATCHMENT**

Green roof technology is incorporated into the roof garden, helping to reduce stormwater runoff and thus minimising the loading onto stormwater drains. The green roof can also be replaceable. Whilst currently proposed as a roof garden, the space can be converted in the future to a further habitable room. The rainwater captured by the sloping roof would be collected into water storage tanks from which the water harvested would be used for irrigating the vegetation within the development.

**ORIENTATION AND CLIMATIC RESPONSIVENESS**

A "back to basics" approach to the environmental strategy is applied, which is passive and lo-tech. Carefully orientating the building to present the shorter faces to the east and west helps minimise heat gain and therefore lower cooling loads. This is complimented by deep overhangs to provide shade and respite from the sun and tropical showers, all of which help reduce the reliance on mechanical ventilation, cooling systems and its associated costs. Daylight analysis of the narrow plan form demonstrates excellent daylight penetration to the habitable areas, reducing the need for artificial lighting during the day and into early evening.

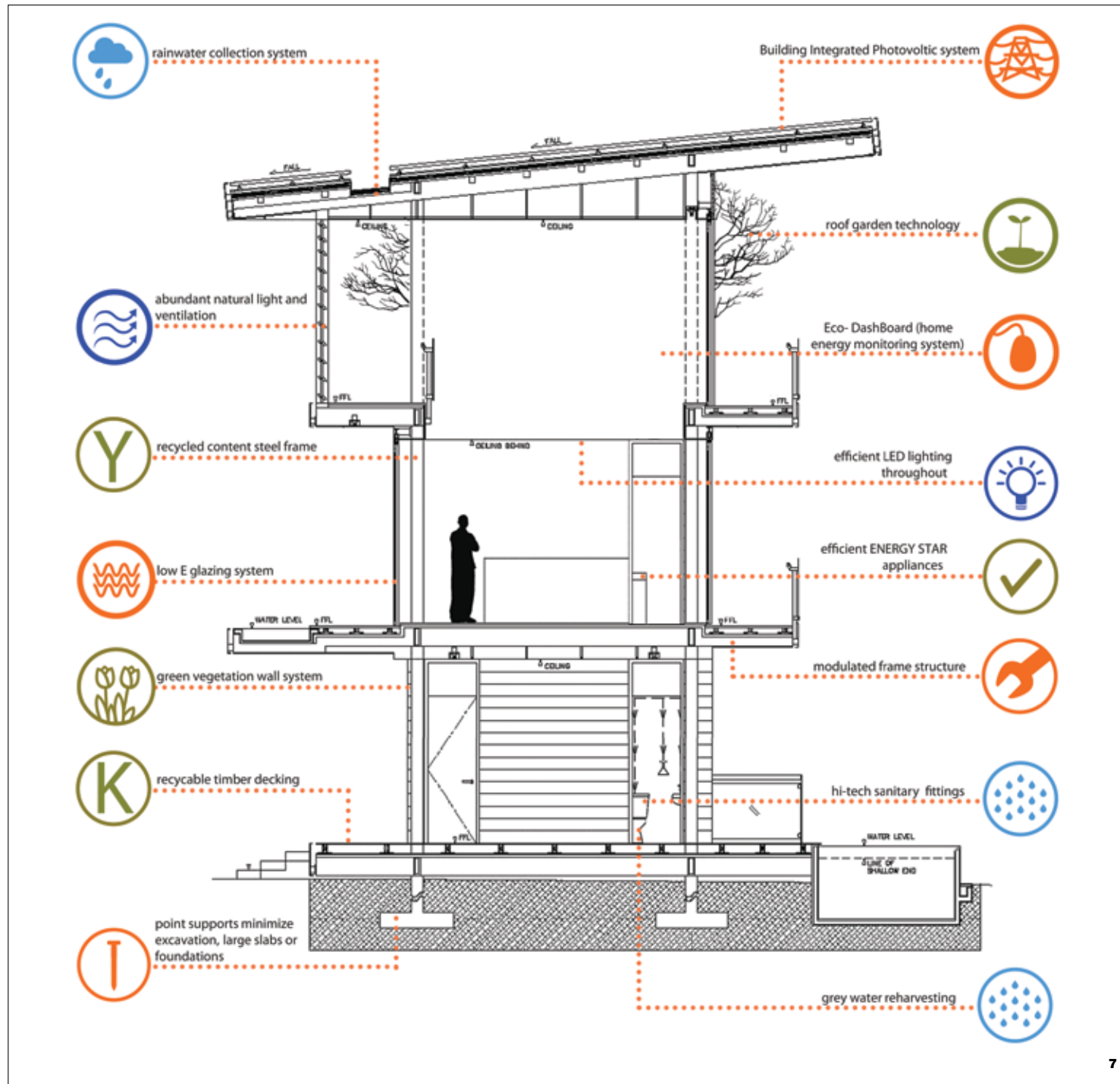
**HARNESSING SOLAR ENERGY**

The Idea House will include the installation of photovoltaic cell technology on the roof to harness the sun's rays as a renewable energy source. Such an approach would be subject to governmental grants to offset the costs of such technology in the increasing interests of promoting sustainable energy sources in Malaysia. Given the cumulative roof area designated for photovoltaic cells, it is anticipated the area provided will generate enough energy to sustain a family of five. It is intended to replace the photovoltaic cell technology after a period of time in order to gauge the relative merits between mono-crystalline, poly-crystalline, and membrane types of photovoltaic cells.

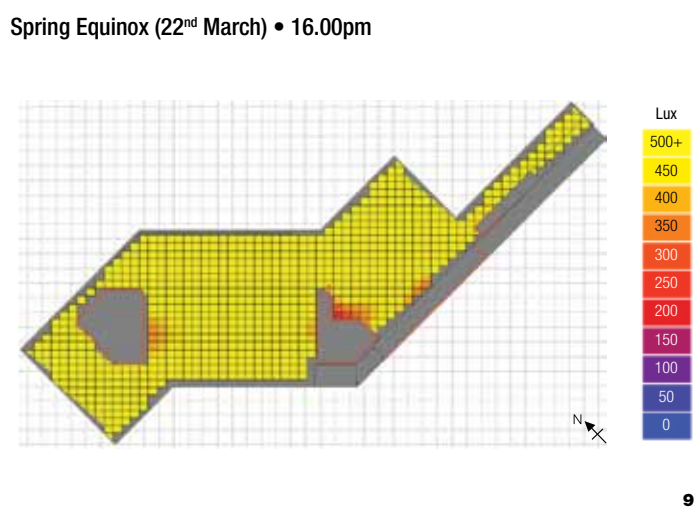
**NATURAL VENTILATION**

The open plan nature of the house, coupled with the ability for the external and internal walls to be slid back to remove any physical internal/external barrier, capitalises on its ability to be cross-ventilated. Orientating the living

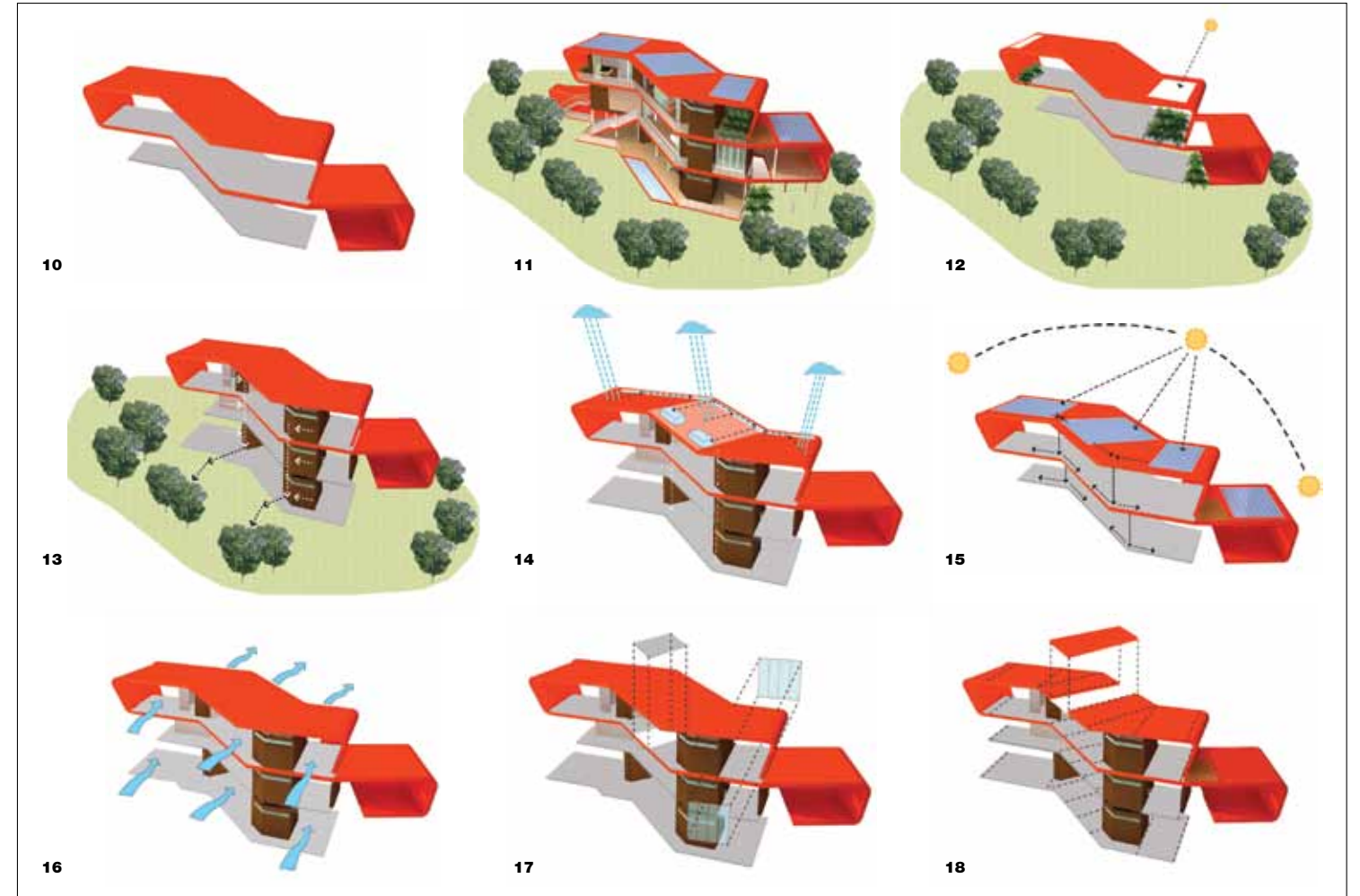




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spaces in a south westerly direction allows for the harnessing of the prevailing southwest wind that takes place 80 percent of the year and therefore reduces the need for artificial methods of ventilation and air flow. Computational fluid dynamics (CFD) analysis confirmed that the curvilinear profile reduced wind eddy with no obstructions. Internal temperature and humidity levels were also lowered, with the wind velocity of 1 m/s within building being more than the 0.6 m/s required by Green Mark.

**EXPANSION AND CONTRACTION**

An understanding of the needs of the Malaysian demographic, coupled with due respect of the expansion and contraction of the family nucleus, finds its expression in the Idea House as a fully adaptable dwelling. Void spaces can be filled to create further living or sleeping spaces as the family expands, or removed in the future as the children grow up and leave home. Open plan living allows for a more flexible lifestyle, promoting internal/external adaptation of spaces to be changed to suit the families' live/work/play requirements.

**MODULARISATION AND EASE OF CONSTRUCTION**

Modern methods of construction that includes prefabrication and modularisation will reduce the reliance on specialist labour/wet trades, and provide opportunities to employ individuals with a lower skills base. The modular construction also enables a speedier construction process, saving time and therefore financial/resource burden. As the entire frame and construction would be modular to provide not only speed and ease of construction, it also provides the ability for the development, if necessary, to be demounted in the future in order to preserve the terrain for future generations and/or future development.

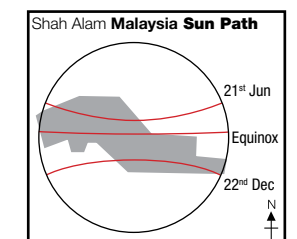
**MULTI-DISCIPLINARY COLLABORATION**

Right from the outset, the approach to the brief demonstrated the importance of collaboration—giving due recognition to the concept that a sustainable product can only be truly created if there is a sustainable process in place. A multi-disciplinary interface between architects, engineers, landscape designers,

urbanists, contractors and suppliers minimised the project programme by 50 percent when compared with the generic residential model. In order to achieve this, the team's common understanding that the Idea House would become a benchmark in sustainable residential design and act as a precedent for Malaysian lifestyle living, and that such a position would only be attainable through pro-active knowledge sharing either via workshops or BIM models was therefore fundamental.

- Project Name**  
Idea House
- Location**  
Bukit Jelutong, Malaysia
- Status**  
Construction documentation
- Expected Completion**  
July 2009
- Site Area**  
NA
- Gross Floor Area**  
400 m<sup>2</sup>
- Number of Rooms**  
3 bedrooms (with ability for extension to 5)
- Building Height**  
2 storeys
- Client/Owner**  
Sime Darby
- Architecture Firm**  
Broadway Malyan
- Director in charge**  
Jason Pomeroy
- Local Architect**  
Alizar Architect
- Landscape Architect**  
Clouston Design
- Main Contractor**  
NA

- Mechanical & Electrical Consultant**  
Perunding Eagles Engineers
- Structural Consultant**  
Mohd Asbi Associates
- Cost Consultant**  
KPK Quantity Surveyor
- Images/Photos**  
Broadway Malyan; Connell Wagner (CFD and daylight analysis diagrams)



7 Sustainable strategies diagram  
8 Perspective view 9 Daylight analysis 10 to 18 Massing diagrams