GREENBEQUEST

by Calvin Low

Singapore’s Gardens by the Bay plan wows as it endows Singaporeans with an historic and strategic asset

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GARDENS, are, by definition, unnatural; they are man-made. Yet, in their myriad manifestations throughout history, these planned spaces have arguably represented man’s most earnest attempts to express his close connection with Nature, and at times, his seeming supremacy over it.

This connection has not always been celebratory, or even symbiotic; ecologically exploitative farming being a case in point. But the best examples of gardens since time immemorial have come to embody man’s most cherished aspirations, both earthly, and divine.

Think the fabled Hanging Gardens of Babylon, the manicured lawns of the Palace of Versailles, and the hypnotic sand and moss garden of Ryoanji temple in Kyoto. These are but three paragons of man’s continuing pursuit of pleasure, power and the pastoral through managing Nature.

What place will Singapore’s ambitious Gardens by the Bay (GB) project occupy in this rich panoply of horticultural hallmarks? And what architectural approach will be adopted in this verdant venture?

CONTINUING A LEGACY

Green fingers have long been valued in Singapore, an old hand in the ‘Garden City’ movement. As early as 1963, a Tree Planting campaign had been started by then-Prime Minister Lee Kuan Yew, who explained in his book From Third World To First that making Singapore a tropical garden city was one way to achieve First World status—way before the global green movement became fashionable.

Tree Planting Day, officially launched in November 1971, has been observed every single year since, with the latest tree planted by now-Minister Mentor Lee on 9 November, 2007, at a new park connector in Queenstown.

Such park connectors, nature reserves, sanctuaries, botanic gardens and parks of all sizes are part of an extensive matrix found in every corner of this ‘clean and green’ island, and an integral part of the Singaporean way of life. It is no empty boast that, within 30 minutes from Singapore’s throbbing city centre, one is able to immerse in the various environments of a balmy beach, a breezy hilltop perch, a primary jungle, or a mangrove flat.

To up the ante further, Singapore has, in the last few years, repositioned itself as a ‘City in a Garden’. This literal inversion of the erstwhile ‘Garden City’ label is illustrated by an internationally-circulated image in tourism brochures showing the skyscraper skyline of Singapore’s Central Business District seen through a jungle-like vignette. This view is from the reclaimed Marina Sands south of the old city centre; the site of the GB.
Singapore’s NParks, the lead government agency developing the GB, puts its objectives succinctly in corporate-speak: "(The GB) will boost Singapore’s global standing in tropical horticultural excellence, and enhance our distinctiveness as a Tropical Waterfront Garden City.

"Ultimately, Gardens by the Bay will help enrich the lifestyles and recreational activities of Singaporeans and tourists alike through high-end entertainment opportunities and a sustainable green infrastructure. It will have a major impact on Singapore’s future economic development and growth."

"The site, sitting on choice reclaimed state land at the heart of the proposed new downtown, and with the Gardens at Marina South alone expected to cost S$900 million, economic returns would be a serious deliverable. Understandably, however, these returns may not be monetary, as it is recognised that the GB constitutes a strategic and, indeed, historic largesse to all Singaporeans.

As Dr Tan Wee Kiat, Director of the GB project puts it: "(The GB will be) perpetually accessible to even the humblest of Singaporeans. Such spaces will come to embody and signify the homeland for which duty, love, honour and sacrifice are due."

For most, however, it would be considered an unqualified success if Singaporeans, who possess a greater collective propensity for shopping centres and food courts, would throng the GB and spout its name in the same breath as "Orchard Road" and "chicken rice."

**ARCADIA REVISITED**

The plan is to create a new and sustainable 24/7 destination the size of 177 soccer fields (101 hectares), for family and friends to enjoy all year round. Two water bodies—Marina Channel and Kallang Basin—will carve the GB site into three separate parks, linked by bridges, each offering distinct experiences.

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To harvest the best design ideas, an international design competition was held. The winning teams—led by Grant Associates and Gustafson Porter Ltd, both of the United Kingdom, for the Gardens at Marina South and Marina East respectively—were announced in September 2006. The masterplan for the third and smallest site—Gardens at Marina Centre—was deferred to allow the possibility of greater Singaporean design input.

Commonly, the selected garden proposals reflect the fact that Singapore is located at the crossroads of global human traffic, which, in addition to its own tremendously rich indigenous biodiversity, has introduced yet more plant species from far-flung reaches of the world.

Another common concern—and a sign of the times—is that the design of the Gardens is rooted in being environmentally friendly. From the onset, the GB was intended to be Green Mark-certifiable (Green Mark is a green building system to evaluate a building for its environmental impact and performance in Singapore). Thus, environmental sustainability and the generation and use of renewable energy are consistent themes of the winning designs.

The nuts and bolts of the winning proposals are currently being developed and reviewed on a quarterly basis. The designs of the September 2007 edition, reviewed here, show promise in keeping the buzz of a new Singaporean icon in-the-making alive.

**LION GARDENS**

At 54 hectares, the Gardens at Marina South are the largest of the three GB sanctuaries. Curiously conceived by Grant Associates as the "Lion Gardens", it is envisaged as a "cosmopolitan sanctuary" comprising "intelligent new infrastructure", an "artificially sustained world...plugged into the landscape."

The scheme will offer cultural theme gardens that reflect Singapore’s multicultural constitution, such as a Nonya Garden, for the Peranakan community. There would also be other gardens featuring plants...
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of utility and commerce, such as nutmeg, rubber and oil palm—the botanical currency of Singapore’s colonial heritage.

The scheme also provides public open spaces for mega events, both outdoor and indoor, and food and beverage installations, all on a site ringed by water. What ionises this plan, however, are the pair of cooled conservatories and clusters of ‘Supertrees’ dotting the landscape.

**GLASS ARKS**

The conservatories, opportunistically perched at the water’s edge of the Marina Channel, will rise like misty headlands, housing the exotic environments necessary to support plant-life which would otherwise not grow in Singapore’s tropical climate. They are veritable glass arks.

The larger conservatory is dedicated to the cool-dry, springtime climate of the Mediterranean and semi-arid, sub-tropical regions. Inside this gigantic, air-conditioned bubble, the visitor will be greeted by expansive displays of flowering plants—tulips, roses, and the like—changing with the festive occasions. Faux hillsides, raised on concrete legs and dubbed the ‘Discovery Terraces’, will ring these fields of colour and offer multiple perspectives of the entire display.

The smaller conservatory is dedicated to the cool-moist climate found in tropical mountain regions between 1,000 metres and 3,500 metres above sea level. The centrepiece is an artificial mountain with an elevator-accessed look-out at the peak, from where 1 kilometre of pathways will spiral down to the base.

In essence, this circulation pattern mirrors that of the Solomon Guggenheim Museum in New York City, designed by Frank Lloyd Wright and completed in 1959. There, one descends a continuous ramp, along which the modern art masterpieces of Picasso, Kandinsky and Giacometti are showcased. At ‘Cloud Mountain’, as this conservatory has been dubbed, visitors will be able to stroll downhill and appreciate, at close range, the botanical exemplars of the cool-moist montane climate, sans clumsy trekking gear and leeches.

The architecture of both conservatories is ‘organic’, though not in any romantic sense of the word. Rather, it is reminiscent of the scheme for No. 150 Cecil Street by James Ferre, where a simultaneous strategy of structure, climate control, and aesthetics is embodied in the armature of fins that cover the building and give it its architectural distinctiveness. The design for No. 150, Cecil Street was, in turn,
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inspired by the work of Italian engineer-architect Pier Luigi Nervi, whose eloquent designs draw from both Classical architecture and Nature.

The architectural design of the conservatories certainly evokes natural imagery, with cockie shells coming to mind. In the competition entry design, the role of the arching structural fins, arrayed in a radiating north-south direction, is to shade the glass areas between them as the sun traverses across the site each day. Furthermore, by orienting the ribs aerodynamically into the prevailing winds on the site, the size of the structural ribs themselves is further reduced.

However, in the design development presented in September 2007, the structural ribs have been further reduced to a ribbon-like lightness, and detached from the glass dome, which now appears suspended from them. The thesis for the ribs to shade 50 percent of the glass in the original submission was a cogent environmental one and it is hoped that this will continue to be met as the design evolves.

The lower solar load on the north-facing façades, which look across the Marina Channel, allows a more transparent fenestration treatment than the sunnier south-facing façades. Thus, more indirect sunlight, reflected off the water of Marina Channel, is allowed to penetrate the interior, lowering the lighting bill of the buildings.

Through such means, the running cost of the cooled conservatories has been claimed to be equal or less than that of a commercial building of the same footprint size, according to the original design. If maintained in the final design, this would be a coup for green architecture.

LILLIPUTIAN LANDSCAPES
Spectacular as the conservatories promise to be, the pièce de résistance of these Gardens, for their sheer eloquence and majesty, must be the “Supertrees”.

These 18 gigantic, twiggy chaless, rising up to 17 storeys in height on their slender trunks, which are wrapped in luxuriant plant life, promise an other worldly presence, whether from the new super high-rises of Marina Bay, or from the ground, where a Lilliputian experience awaits.

Beyond being foilies, those extravaganz, whimsical structures designed as conversation pieces in 18th-century English gardens, the Supertrees are an object of our times. As ‘environmental engines’ of
Gardens by the Bay will set the standard for new generation garden development and management. It will apply sustainable energy and water solutions in the design and development of the Gardens. The Cool Conservatories and SuperTrees as an integrated system will showcase the application of sustainable energy solutions.

With innovation in design and application of advanced technologies, it is possible to reduce the utility cost of operating the Cool Conservatories, making it comparable or less than that of a good air-conditioned commercial building of the same footprint.

SuperTrees, a fusion of nature, art and technology, will serve as environmental engines for the Cool Conservatories. They embed technologies for water harvesting and storage, air intake, cooling and exhaust, photovoltaic panels and solar collectors.

Images courtesy of NParks
Ultimately, Gardens by the Bay will help enrich the lifestyles and recreational activities of Singaporeans and tourists alike.

The glass arches, their raison d'être is firmly grounded in the environmental concerns of the 21st century.

The insides of the Supertrees' crowns are lined with photovoltaic cells to harvest the sun's energy and generate electricity to power pumps which draw water from underground rainwater reservoirs to treetop water storage tanks that supply water for fountains and other water features. There are also hot water solar collectors located in the crowns, for desiccant regeneration.

Various structural and cladding systems for the Supertrees have been studied. These include steel, concrete and hybrid steel-concrete systems for the structure and 'weaving', 'honeycomb' and 'branch' systems of cladding.

As the trunks are proposed to be covered in plant life up to a height of 30-35 metres, the cladding system will incorporate the means by which these plants can be bedded, irrigated, fed and misted. And this system must be flexible enough to accommodate different kinds of plants—from the bougainvillea and lilies for the perimeter clusters of Supertrees, to the orchids, moss and ferns proposed for the central grove of Supertrees, dubbed the 'Lion Grove'.

The original proposal also includes aerial walkways suspended between Supertrees at a height of some 35-40 metres in the air. Accessed by lifts installed in the Supertrees' trunks, this will enable visitors to enjoy spectacular aerial views of the Gardens.

WALK ON WATER

If, as a feature, water played second fiddle to the conservatories and Supertrees in the Gardens at Marina South, at the 32-hectare Gardens at Marina East across the Marina Channel, there will be "water, water, everywhere".

Conceived by the team of Gustafson Porter Ltd as an 'aquatic tropical garden', the pervasive aquatic presence will be achieved through the creation of five water inlets that will carve the 150-metre to 230-metre wide linear park into smaller, leaf-shaped theme gardens. Waterfalls, reed beds and a 2 kilometre-long waterfront promenade complete the water-themed scheme.

In contrast to the spectacular scale of the Gardens at Marina South, these gardens, to be completed as Phase Two of the project, will offer a more subtle and therapeutic experience where the lines between the elements—water, landscape and architecture—are deliberately blurred. As such, the Gardens promise experiences beyond the visual.

For instance, the design concept is inspired by the micro-climatic characteristics of the site. Thus, prevailing breezes on the site will be channelled through the creation of new hills and mounds, making this garden even cooler then the Singapore Botanical Gardens. In acknowledgement of the major local food cultures, as well as the fact that people prefer to visit parks in the evenings, 'food gardens' and a 'night garden' will be created.

The architecture in these gardens will be low-key, the idea being to integrate the architecture into, and even inside, the landscape. Hence, there will be a minimal amount of visible 'normal' roofs. Most roofs will either be 'green'—arrayed with photovoltaic cells to create energy—or 'greened'—with planting on them.

This pervasive green approach to the design of the Gardens at Marina East is, according to lead designer Kathryn Gustafson, not something that is New Age. Rather, given the sorry state of the world's environment, her approach is simply about being pragmatic. It is simply about 'survival'.

In this, both the Gardens at Marina East and at Marina South share a common contemporary concern for the environment, adroitly addressed in their own distinctive ways. If delivered, the GB promises to not only be an oasis of pleasure, but also provide peace of mind, and a worthy addition to man's global gardening legacy.