

SINGAPORE



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ONWARDS AND UPWARDS

Skyrise planting suits Singapore's climate and landscape. **Darryl Moore** reports on the progress of its 15-year plan to become a 'City in a Garden' →



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Marina Bay Sands

LEFT Marina Bay Sands hotel boasts a 145m-long infinity-edge pool. The hotel is a visible landmark in the city

FACING PAGE The office block One George Street seamlessly blends horticulture with architecture

Dressed in a white short-sleeved shirt, Singapore's first Prime Minister Lee Kuan Yew upped tools on 16 June 1963, and under the watchful eyes of a crowd of eager apparatchiks, laboured to plant a Mempat Tree. Indigenous to Southeast Asia, *Cratoxylum formosum* bears flowers with small pink petals and a yellow centre that resemble the cherry blossoms of Japan. But aside from a desire to enjoy its obvious future aesthetic delights, that act of planting the tree embodied a high degree of symbolic capital for the soon-to-be-independent city-state. Inaugurating a national tree-planting day was a literal manifestation of the important role being invested in horticulture to transform an under-developed economy without natural resources into a major international player, by becoming a 'Garden City', attracting foreign investment and transforming the quality of life of its citizens along with it.

The economic and environmental success of Singapore over the past 50 years has fed into its current 15-year master plan directed by the National Parks Board, which now envisages the country becoming a 'City in a Garden', upping its green ante and rising to the challenges of ensuring a sustainable future. Gardens by the Bay (*see GDJ*, December 2013) represents a certain apotheosis of this drive to fuse both the national economy and identity with the landscape, but just as ambitious is the blue-sky thinking, which is looking upwards

for green inspiration. Given the increasing urban density and premium value placed on land, the city's burghers have been encouraging environmental diversification with skyrise greenery that intimately integrates horticulture and architecture. Following early examples from the 1970s and 80s, innovative construction technologies have propelled the development of a plethora of new garden typologies including green walls, skygardens, sky terraces and even sky bridges, giving birth to a truly impressive vertical garden city in recent years.

Clear benefits

Given the climate of tropical rain and humidity, along with benign wind conditions, skyrise planting in Singapore is a viable and logical strategy, useful as a means of shaping previously unconsidered spaces and cladding surfaces. The benefits are plainly manifest, not only in terms of creating vibrant and much-needed recreation and amenity spaces, increasing floral and faunal diversity, but also in improving the performance of buildings and reducing their impact on the environment, while enhancing the quality and distinctiveness of the built realm. To date, the city boasts more than 50 ha of green roofs with key targets set for future growth. Encouragement through policies, financial incentives and tax exemptions have played key roles in the process, with as much as 50% of installation costs funded

by the government for retrofitting existing buildings with roof gardens. The establishment of the green building rating scheme BCA Green Mark, supported by the National Environment Agency, provides benchmark assessment for schemes based upon internationally recognised best practices in sustainable design and performance, offering developers key differentials in a competitive real estate market.

Unsurprisingly, progressive property moguls have been quick to take advantage of such opportunities, with uptake in the commercial sector playing a key role in creating dazzling displays of vertical greening. In Singapore's dense Central Business District, the ground-level lobbies of the box-like office block One George Street, open out into the small adjacent park Hong Lim Green, creating a seamless continuum between the private and public realms. But a casual glance skyward reveals the building's true landscape credentials, with voids of green carved out of each of the four elevations at different levels, sky gardens on the 5th, 12th, 15th and 22nd floors contrast boldly with the glass and steel of the building, providing a horticultural yin to the architectural yang.

Natural inspiration

The largest of these occupies the majority of the 5th floor, allowing just enough space to also accommodate a gym and a few offices. The sky garden's palette of grey stone, brown timber, green planting and blue water references the elements of earth, sky and water. Stone surfacing traces a ribbon effect around the large open area defining the space, while beyond it a river-like water feature borders the perimeter, snaking its way along from its source to a 25m lap pool with infinity edges, →

"THE SKY GARDEN'S PALETTE OF GREY STONE, BROWN TIMBER, GREEN PLANTING AND BLUE WATER REFERENCES THE ELEMENTS OF EARTH, SKY AND WATER"





LEFT The entertainment and retail complex Bugis+ is studded with striking hexagonal panels, ensuring it fits right into the city's creative quarter
FACING PAGE An imposing site, PARKROYAL is a new luxury hotel development, designed by local architects WOHA

"THE BUGIS+ EXTERIOR IS INTERRUPTED WITH A MULTITUDE OF INTERMEDIATE SKY TERRACES AND ROOFS WITH CASCADING GREENERY THAT RECEDE INTO THE 10-STOREY BUILDING"

engaged in a dialectic dialogue with the borrowed landscape of the Singapore River below. The amorphous sinuous shapes of the garden's design by landscape architects Sitetecnonix call forth comparisons with the mid-century Modernism of Thomas Church and Garrett Eckbo, creating an aesthetic culture clash with the contemporary skyline. Spaces on the 12th, 15th and 22nd floors provide areas of respite for workers, insects and sunbirds alike, successfully fusing landscape, environment and architecture in a highly urban context.

In 2008, the design won the inaugural National Parks Board and the Singapore Institute of Architects Skyrise Greenery Award, while the sky gardens' ability to reduce the local ambient temperatures and ease the cooling load of the building was recognised with a Green Mark Gold award.

'Hotel in a garden'

Across the road sits PARKROYAL on Pickering, part of a new generation of sustainable luxury hotels developed by Pan Pacific Hotels Group Limited. Designed by locally based architects WOHA, a practice at the forefront of leading the charge in creating a new urban vernacular fusing flora with architecture, the building has been conceived as a 'hotel in a garden'. The 16-storey skyscraper is instantly arresting from street level, with its deconstructed geometric laminations

interspersed with an organic array of sky gardens, green walls, and planter terraces, providing a sense of spatial intrigue for even the most casual viewer.

Featuring more than 15,000m² of greenery (amounting to twice its footprint), its key calling card is surely the four-storey-high terrace gardens, adorned with lush flora creating enclosure from the surrounding city. Seating and even large-scale colourful suspended birdcages offer visitors areas for luxuriant repose. Its numerous other green features, recognised with a Green Mark Platinum certification, include rainwater harvesting, solar power, sensors regulating water and energy, and highly efficient heating and cooling systems.

Another WOHA-designed project is the entertainment and retail complex Bugis+, with its future shock facade, studded with shimmering 'crystal mesh' faceted hexagonal panels and digital screens illuminated with images, text and graphics, providing a fitting focal point for the city's creative quarter. The exterior is interrupted with a multitude of intermediate sky terraces and roofs with cascading greenery, which recede into the 10-storey building creating localised event spaces, while an enclosed rooftop garden features a large area with Burle Marx-style ground patterning.

Located next to Gardens by the Bay is Marina Bay Sands, a hotel hosting a novel oasis of urban green designed by Boston-based architect Moshe Safdie. Responding to a brief addressing the problem of limited outdoor space for such a major

development, the boat-shaped Skypark balances at a height of 200m on top of three 55-storey hotel towers. Occupying an area of more than 1 ha and stretching 340m, it boasts an impressive 65m-long cantilevered section, teetering high above the city. The uniquely defined structure is a distinct landmark, clearly visible from vantage points near and far, while the views from atop offer a breathtaking panorama. The Skypark's facilities include jogging paths, a public observatory, restaurants and lounges, as well as a swimming pool with an impressive 145m-long infinity edge.

The landscape design by Peter Walker & Partners offers an array of planting with particular attention given to providing much-needed shade to the exposed site, which can accommodate the needs of up to 3,900 visitors, as well as ensuring everything is adequately embedded to withstand exposure to strong winds. Trees and palms, sourced from nearby Malaysia and Thailand, were selected for their resilience to the strong winds at such a height, as well as for their form, texture and colour. Planting including Frangipani (*Plumeria rubra*), Black Olive (*Bucida buceras*), Betel nut palm (*Areca catechu*) and Nicobar palm (*Bentinckia nicobarica*), were all stored at a nursery for a year before the precarious process of installation, employing additional safety measures to protect the plants while craning them 200m skyward to their new abode.

Office inspiration

Located in the Fusionopolis area, masterplanned by Zaha Hadid and dedicated to technology, media and engineering, Solaris is a 15-storey office building designed by Malaysian-based architects T. R. Hamzah & Yeang Sdn Bhd,







LEFT Yayoi Kuzama sculptures at Orchard Central – Singapore's first retail-only vertical mall
FACING PAGE, TOP The public housing blocks Pinnacle@Duxton sit right in the heart of Chinatown
FACING PAGE, BOTTOM Orchard Central was built in 2009; it won the Skyrise Greenery Awards in the same year

"80% OF SINGAPORE'S RESIDENTS LIVE IN PUBLIC HOUSING DEVELOPMENTS, SO THE NECESSITY TO PROVIDE ACCESS TO GREEN SPACES IS OF PARAMOUNT IMPORTANCE"

headed by Ken Yeang, whose much-respected pioneering work over the past 30 years has forged the path for integrated ecological design systems.

Comprised of two towers connected by a central atrium, office floors are linked by a series of sky terraces at upper floors, while a 1.5km landscaped ramp wraps around the perimeter. The ramp is a green link between the adjacent ground-level park and a cascading sequence of roof gardens at the top levels of the building, providing uninterrupted access for biodiversity, creating local ecosystems and providing continuity between the industrial zone and nearby natural areas.

The project features 8,000m² of landscaping, a total more than the area of building, with 95% of it above ground level. Continuous strips of vegetated green walls adorn the facades, covering a total area in excess of 1,460m² (32% of the total surface area), all of which contribute to the building functioning as a living filtration system, improving air quality, reducing carbon dioxide levels, regulating humidity, reducing noise and lessening the urban heat island effect.

Shoppers suffering severe consumer fatigue on Singapore's main retail thoroughfare can find 24-hour respite at Orchard Central, the country's tallest and first retail-only vertical mall, at the junction of Orchard and Killiney Roads. Created in 2009 and winner of the Skyrise Greenery Awards the same year, the mall is home to 603m² of green roof space and 205m² of green walls designed by Japanese interior designer Takashi Sugimoto.

A lush 8m-tall green wall provides a link between landscaped roof decks on the 11th and 12th floors, which provide secluded alfresco enclaves for a series of bars and restaurants. Ponds on the 12th floor offer a surprising aquatic interlude, while the terrace below is animated by colourfully playful sculptures by Japanese sculptor Yayoi Kuzama.

Given that 80% of Singapore's residents live in public housing developments, the necessity to provide access to green spaces within these high-rise conurbations is of paramount importance, with every roof, terrace and balcony presenting creative opportunities. The city sports many fine examples of skyrise gardens addressing the diverse needs of communities such as Central Horizon, Punggol Breeze and Jardin, but the most formidable is surely The Pinnacle@Duxton, towering at a height of 50 storeys in the heart of Chinatown. The world's tallest public housing buildings feature seven individual blocks sitting on an elevated parking deck, connected by 500m-long curvilinear sky bridges at the 26th and 50th floor levels.

A winning design

Following a competition in 2002, a design challenge to replace the existing public housing blocks on the site with units at three times the density, was awarded to Singapore architecture firm, Arc Studio

architecture+urbanism with landscaping duties handled by EnviroSpace Consultants. The impressive result maximises the outdoor opportunities on the two levels that interlock the buildings. Terraces and sky bridges on the 26th floor feature a residents committee centre, outdoor gym, playgrounds and 800m running track, while the 50th floor provides a more contemplative sequence of outdoor living spaces, featuring seating areas, pavilions, star-gazing pods and dizzying viewing points, conferring sight lines across the island. Raised amoebic landforms break grade to provide a variable landscape interspersed *Dalbergia* trees, with which both halts and defers the gaze to the peaks and troughs of the surrounding cityscape.

Extensive ground-level landscaping, rooting the buildings to the site, included retaining mature Jambu Ayer (*Syzygium samarangense*) and Nutmeg trees (*Myristica fragrans*) planted by Minister Mentor Lee Kuan Yew in 1984 and 1989. The symbolic significance of the trees is clearly evident. From 1963 to the present, and looking forward to the future, horticulture has been a driving force in the Singapore's national vision. Greying the green has been key to transforming the country's infrastructure, housing and tourist economy, and is something which is continuing apace.

The commitment to take this further skywards is apparent from the roster of 'starchitects', including Norman Foster, Rem Koolhaas and Toyo Ito, currently engaged in creating buildings in which plants play a primary role, in not only shaping Singapore's cityscape, but also in redefining notions of our own habitat and engaging with both locals and visitors with horticulture at the highest levels. ○

