





# flourishing innovations

As Singapore's urban spaces develop, the local landscape industry keeps pace by continuously improving itself in the pursuit of greening up Singapore. NParks partners the landscape industry holistically, to ensure a vibrant and conducive environment for the development of skills and initiatives that support our urban biodiversity goals. These range from skysrise greenery – a term first developed in Singapore – to innovations supporting the growth of trees in areas affected by development. These partnerships contribute to the quality of our living environment by integrating greenery into infrastructure, and creating urban habitats for biodiversity.

With its terraced levels of rooftop gardens, Khoo Teck Puat Hospital successfully integrates themed garden spaces for healing with its various patient care facilities. This holistic approach to skysrise greenery provides a therapeutic environment for the hospital's patients and their guests. The development was awarded First Prize in the SIA-NParks Skysrise Greenery Awards 2010.



01 The Ovalis Plantercell System, developed jointly by Ngee Ann Polytechnic and CUGE, allows for creative indoor and outdoor placement of its egg-shaped modules.

02 Minister for National Development Khaw Boon Wan tours one of the many rooftop gardens at Khoo Teck Puat Hospital. Some of the themed gardens are dedicated to spice and produce, while others cater to specific needs of the hospital's patients.

03 The first-ever International Skyrise Greenery Conference featured award-winning experts including Patrick Blanc, who invented the concept of vertical greenery.

## Rising to Greener Heights

Skyrise greenery is greenery that is integrated into built-forms: green roofs, green walls and sky terraces. It helps to soften the harshness of the high density built structures in cities as well as to contribute towards a better urban environment. Today, skyrise greenery is recognised as an important component in the greening of cities.

In November 2010, more than 470 delegates from 28 countries converged for the inaugural International Skyrise Greenery Conference in Singapore. Organised by CUGE and the International Green Roof Association, the Conference provided a valuable platform for knowledge sharing and professional networking as well as showcasing prominent green roof and vertical greening projects in Singapore. The three-day conference saw over 30 internationally-renowned industry leaders from 10 countries sharing the latest insights and trends on integrating greenery with buildings.

2010 also saw the third iteration of the SIA-NParks Skyrise Greenery Awards. Jointly organised by Singapore Institute of Architects (SIA) and NParks, the Awards aim to promote and recognise the greening of high-rise developments. As further evidence of the growing recognition of this Award, 27 submissions were received – almost double that of the previous year.

The Green Roof Incentive Scheme (GRIS) is an NParks programme that encourages the installation of green roofs on existing buildings. This programme received an enhancement in March 2011, with the Skyrise Greenery Incentive Scheme (SGIS). This scheme subsidises up to half the costs for installing retrofitted green walls in existing buildings. The SGIS addresses a heightened interest in vertical greenery and the increased availability and variety of products for green walls.

Two new skyrise greenery systems have also been developed by NParks jointly with its partners: HDB's Building Research Institute and Ngee Ann Polytechnic. Both these systems allow the easy creation of interesting and attractive landscaped interior and exterior walls.

To help building owners implement green walls smoothly, NParks also provides technical advice on vertical greenery technology as well as resources to aid developers and individuals in building green roofs. A series of CUGE Standards was published by CUGE on various aspects of rooftop greenery, including design loads, growing substrate and drainage, and safety considerations.



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01 Green Thumbs is a milestone event for Singapore's landscape industry. Besides showcasing the skill sets of the landscape workforce, it is a day for celebrating the industry's growth and transformation.

02 NParks aims to not just raise the skill levels of the industry, but also to instill pride and professionalism into every worker.

03 & 04 The development of container trees allows mature trees to be embedded in tree planting verges, then relocated relatively easily with minimal impact to the tree's health.



# Singapore's ever-changing and evolving landscape industry is central to the development and maintenance of its green spaces, which in turn support the city's wealth of urban biodiversity.

## **A Vibrant Landscape Industry**

Green Thumbs is an annual landscape industry event organised by NParks, in collaboration with the Singapore Landscape Industry Council (SLIC), the Landscape Industry Association of Singapore (LIAS), Employment and Employability Institute (e2i), and WDA. Since 2006, the event has celebrated the development journey of the Singapore landscape industry and the skills of its workers, and enhances the industry's profile and image.

Held on 11 September, Green Thumbs 2010 showcased a range of competencies in the landscape industry. Over 150 landscape practitioners from 25 companies demonstrated skills such as tree climbing, chainsaw operations, excavator operations, turf maintenance, and landscape design implementation. Also featured for the first time was the multi-skilled Landscape Productivity Pentathlon Championship, where teams went through a competition which showcased a set of five skills.

At the same event, it was announced by Deputy Prime Minister Teo Chee Hean that the landscape industry will receive support from the National Productivity Fund to undertake a new Landscape Industry Productivity Roadmap. It aims to benefit all 23,000 workers in the industry, and improve productivity in the landscape industry. At the same time, it will raise workers' skill levels and restructure work operations to boost efficiency.

In May 2010, NParks and the Building and Construction Authority (BCA) introduced a new category of Green Mark awards – the BCA-NParks Green Mark for New Parks. This award aims to inspire and promote sustainable park design, and identify best practices in park design, construction, management and maintenance planning. It was

specifically developed for civic landscape areas, examining social and economic sustainability with a strong emphasis on environmental sustainability. At the 2010 awards, NParks' Dairy Farm Nature Park was among the first parks to be presented with the Green Mark for New Parks Certification.

## **Innovative Solutions for Growing Trees**

Singapore's increased urban density makes it difficult to provide large, unobstructed spaces for growing trees. To address this problem, CUGE has researched the use of structural soil and structural cells. These systems can be placed under paved areas to support tree growth while accommodating traffic loads, without compromising on the normal functions of the paved surfaces. To date, structural soil and structural cells have been piloted in a variety of areas including Springleaf Linear Park, MacRitchie Reservoir Park, and a carpark in Punggol Park.

Residents of Cashew Constituency can now enjoy the instant greenery provided by 27 container trees planted along Cashew Road. These Bintangor bunut (*Calophyllum soulattri*) trees are planted in specialised containers, jointly developed by NParks and the Nanyang Technological University through a joint research and development project.

Implemented in 2010 for the first time in Singapore, these containers allow trees to be planted along roads slated for future development. The containers can be embedded in the regular tree planting verges along new roads, and subsequently relocated with relative ease when these roads are widened or diverted. This minimises the negative impact that tends to occur when large trees are moved, and allows the trees to thrive in their new location. Container trees also do not need additional maintenance over and above the current requirements for roadside trees.