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**PLAY – A CITY OF
GARDENS AND WATER**



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Singapore is well known for being a garden city. Today, close to half of Singapore is covered by greenery, and there are thousands of species of flora and fauna living together with us in our city. Our extensive roadside greenery, parks and nature areas make Singapore a great home to live in.

As our population grows, we will have to make a greater effort to ensure that we continue to make space for greenery and our natural heritage. For the future, we hope to transform our city into a City of Gardens and Water. We want to see our city nestled in greenery, our waterways come alive and our residents enjoy better access to nature and our rich biodiversity. We seek to achieve this in a few ways:

- Creating more parks and nature-based leisure options in Singapore
- Promoting skyrise greenery to soften our densely built urban landscape
- Transforming drains, canals and reservoirs to support recreational use
- Protecting and enhancing our biodiversity to conserve our natural heritage for all to enjoy

Key Recommendations

Creating More Parks and Nature-Based Leisure Options

- 1 Provide 0.8ha of park land per 1,000 persons by 2030. In the shorter term, increase the amount of green park space by 900ha by 2020.
- 2 Make parks more accessible, by tripling the length of park connectors from 100 to 360km by 2020 and developing new leisure options around green spaces.

Promoting Skyrise Greenery

- 3 Add some 30ha and 50ha of skyrise greenery by 2020 and 2030 respectively, including 9ha of green roofs on multi-storey carparks in public housing estates.
- 4 Introduce various initiatives to promote skyrise greenery. This includes co-funding for green roofs in the Central Business District and Orchard Road areas, a landscape replacement policy for new developments in the Downtown Core (including Marina Bay), Jurong Gateway and Kallang Riverside; and bonus GFA for rooftop outdoor refreshment areas to incentivise provision of rooftop landscaping in the Central Area.

Transforming our Waterbodies

- 5 Open up 820ha of reservoirs and 90km of waterways for recreational activities by 2020 and 900ha of reservoirs and 100km of waterways by 2030.

Protecting and Enhancing Biodiversity

- 6 Implement a National Biodiversity Strategy and Action Plan to research, document and conserve biodiversity in Singapore.
- 7 Develop a City Biodiversity Index with international partners to promote biodiversity conservation efforts among cities globally.

CREATING MORE PARKS AND NATURE-BASED LEISURE OPTIONS

Creating New Parks

We will set aside more land for parks.

- The National Parks Board (NParks) has already planned for an additional 900ha of parkland for the next 10 years. This will bring our total parkland to 4,200ha by 2020. By 2030, we aim to have 0.8ha of parkland per 1,000 population.
- The new parks to be created include Gardens by the Bay in the heart of the new downtown, Coney Island Park and the expansion of Sungei Buloh Wetlands. These parks will host various community activities along themes like health and wellness and arts and culture, for park users to enjoy.

Environmentally-Friendly Features in Parks

Our parks will also be greener, in more ways than one.

- NParks will implement new environmentally-friendly measures within all our regional parks. These measures include the recycling of horticultural waste as well as the reduced use of energy, water and chemical products. In addition, NParks will design some of the new parks to enhance biodiversity.

Making Parks More Accessible

- Our network of park connectors will be extended from 100km to 360km by 2020.

These recreational corridors will connect clusters of major parks in the various regions of the island. This network will be complemented by seven loops and a 150km round-island route that allows our people to walk, jog and cycle closer to the coastline and greenery.

Creating New Nature Based Leisure Options

The Urban Redevelopment Authority (URA) has planned for new recreational areas for city dwellers to take a respite from the intense city life in Singapore. Among these are unique leisure venues at Changi Point, Punggol Coast and Lim Chu Kang.

- Changi Point today already offers an array of recreational amenities from chalets and resorts to the popular Changi Village food centre. The URA will build upon the existing infrastructure and lush greenery, to introduce new uses and activities that will enhance Changi as a coastal recreational destination. The Punggol coastline is a popular fishing



Future coastal promenade at Punggol will provide more leisure options for residents



GARDENS BY THE BAY

The Gardens by the Bay comprises three distinctive waterfront gardens – Gardens at Marina South, Gardens at Marina East and Gardens at Marina Centre. The Gardens will be Singapore’s premier urban outdoor recreation space at Marina Bay.

The 54ha Gardens at Marina South will be the largest and the first of the three Gardens to open in 2011. It will showcase the best of tropical horticulture and garden artistry, with displays of tropical flowers and coloured foliage. It will also demonstrate energy and water conservation designs and measures.

At the heart of the Gardens are two key features:

- A Cooled Conservatory Complex. The Conservatories will be an architectural icon,

a horticultural attraction and a showcase of energy-efficient technology. It will provide an all-weather “edutainment” space within the Garden. Comprising a “Cool Moist” biome (0.9ha) and a “Cool Dry” biome (1.2ha), it will display plants and flowers from the Tropical Montane and Mediterranean environments.

- Supertrees. Designed as tree-like structures over 30m in height, the Supertrees are uniquely designed vertical gardens, with emphasis placed on creating a “wow” factor through the vertical display of tropical flowering climbers, epiphytes and ferns. The Supertrees will also be integrated with solar energy and water technologies to help cool the Conservatories.

and leisure destination for families. URA and NParks will be constructing a 11km coastal promenade connecting Sengkang Riverside Park, Punggol Point and Punggol Park. URA has also planned for two recreational clusters along the promenade at Punggol Point and Punggol East where people can enjoy horseback riding and camping.

- URA will develop the Lim Chu Kang area into a weekend countryside getaway by introducing agri-tainment options (such as spas, rustic chalets) amidst existing farms, nature areas and the reservoir. At the Kranji Reservoir, a new nature trail in the Kranji Marshes will offer trekking enthusiasts a view of the freshwater wetland and its resident birdlife and butterflies. Beyond the marshes, there will be new waterfront trails with lookout points and pavilions to offer people

a panoramic view of the reservoir. New park connectors and nature trails will be created to connect parks and farms in the area to make them more accessible to the public.

PROMOTING SKYRISE GREENERY

In addition to expanding park space, we can further expand greenery by going upwards. Skyrise gardens have sprung up on various buildings in Singapore, including the roofs and top decks of Housing and Development Board (HDB) multi-storey carparks and some new HDB flats. Such skyrise greenery reduces heat transmitted through the roof, reduces ambient temperature and glare, improves sound insulation for buildings, and with the right use of plants, can increase our biodiversity.



Rooftop gardens in public housing at Punggol provide more green spaces while optimising land use



MARINA BARRAGE

The Marina Barrage is a prime example of Singapore's holistic approach to water management and is the flagship of PUB's ABC Waters Programme. A 3-in-1 project, it creates an additional source of water supply, acts as a tidal barrier to alleviate flooding in the low-lying city areas and also serves as a lifestyle attraction right in the heart of the city.

The Marina catchment is the island's largest and most urbanised catchment, spanning 10,000 hectares. The Barrage is essentially a dam across the Marina Channel, creating the Marina Reservoir. Together with the new Serangoon and Punggol reservoirs, the Marina Reservoir will increase Singapore's water catchment from half to two-thirds of our land area.

In addition, the Marina Barrage is designed and built on environmentally-friendly principles. Its iconic green roof serves as an insulation layer to lower indoor temperature, thereby reducing the building's air-conditioning requirements. It also has the largest collection of solar panels for a single installation – 405 in all – which convert solar energy into utility grade electricity to supplement the daytime power requirements of the Marina Barrage.

Visitors to the Marina Barrage can enjoy waterfront alfresco dining or picnics on the Green Roof while taking in picturesque views of the city skyline and Marina Reservoir. In addition, they can visit the Sustainable Singapore Gallery to find out more about Singapore's sustainable development efforts.

Our aim is to add 30ha of skyrise greenery by 2020 and 50ha by 2030 through the following new initiatives.

- HDB will target to develop 9ha of green roofs on the top deck of existing multi-storey carparks in the residential heartlands over the next three years.
- The government will incentivise the development of skyrise greenery in strategic locations in the city. NParks will pilot a grant scheme to co-fund up to half the installation cost for green roofs, focusing on the Central Business District and Orchard Road areas for a start. URA will also grant existing buildings within the key activity corridors in the Central Area (such as Orchard and in the existing Downtown) bonus gross floor area (GFA) to be used for rooftop outdoor refreshment areas if developers provide rooftop landscaping for their developments.
- URA will adopt a landscape replacement policy to introduce greenery into new developments, as we develop and intensify the use of our land in the city and new growth areas. All new developments in the Downtown Core (including Marina Bay), Jurong Gateway and Kallang Riverside will have to provide landscape areas equivalent to the overall development site area in the form of skyrise greenery and ground level communal landscape areas.

TRANSFORMING OUR WATERBODIES

We have developed a dense network of canals and waterways to manage storm water and to meet Singapore's water needs. They can also



Our waterways are open for recreational activities such as kayaking

be better used for recreation and to soften our cityscape.

Under the Active, Beautiful, Clean (ABC) Waters programme, PUB, Singapore's national water agency, will transform our drains, canals and reservoirs into beautiful and clean streams, rivers and lakes that are integrated with the surrounding parks and green spaces. These reservoirs and waterways can support water-based recreational activities, such as kayaking, canoeing and sailing and serve as community focal points for events and recreation. This programme brings people closer to our waterways and inspires Singaporeans to keep our waterways clean and to conserve water.

- For a start, 27 projects will be implemented over the next few years. By 2020, 820ha of reservoirs and 90km of waterways will be opened for recreational activities. By 2030, PUB will implement more than 130 projects in business and heartland areas, opening up 900ha of reservoirs¹ and 100km of waterways for recreational use.

¹ The 11 reservoirs which would be opened for recreational activities are: Bedok, MacRitchie, Lower Seletar, Upper Seletar, Lower Pierce, Marina, Pandan, Kranji, Jurong Lake, Punggol and Serangoon.

PROMOTING SPECIES CONSERVATION

Hornbills are large birds and there are only 54 species of them worldwide. There has been no record of the breeding of this hornbill species in Singapore since at least 1855, although birds have occasionally been spotted in Singapore up until the 1920s. Therefore, it was indeed surprising to find the Oriental Pied Hornbill breeding in Pulau Ubin in 1997, as they require large trees for their nest holes. The hornbill population has grown since they started breeding naturally in Pulau Ubin and NParks currently monitors around 45 to 50 hornbills around Pulau Ubin and the Changi area.

To help our local hornbills survive and flourish, NParks coordinated a joint project with Nanyang Technological University, Jurong Bird Park and CVM Private Limited. This project



involves setting up nest boxes in our parks and gardens to entice the Oriental Pied Hornbill to move from Pulau Ubin to the main island. Some of these nest boxes are equipped with video cameras to allow researchers to study their behaviour inside the nests, making it a world-first attempt at studying hornbill nesting behaviour in the wild, in a city setting!

PROTECTING AND ENHANCING BIODIVERSITY

Singapore has rich biodiversity for an island of its size. As a comparison, Singapore, which is 0.2% the size of UK, has some 360 species of birds or 60% of the number of species found in the UK. This is despite us having a vibrant economy, one of the highest population densities in the world, and no countryside or hinterland.

Today, key indigenous ecosystems – namely the Bukit Timah Nature Reserve (lowland dipterocarp forest), Central Catchment Nature Reserve (freshwater swamp forest), Sungei Buloh Wetland Reserve (mangroves) and Labrador Nature Reserve (coastal hill forest) – are legally

protected. These four nature reserves cover more than 3,000ha or 4.5% of Singapore's land area.

In land scarce Singapore, we will always have to make tough trade-offs between different land uses. Nevertheless, we will keep the Nature Areas² for as long as possible. Some of these areas are integrated with parks to allow our people to get closer to and enjoy nature. The URA will also seek to focus development in urbanised areas before undeveloped areas are opened up. Where development must take

² As reflected in the Special & Detailed Controls Plan of URA's Master Plan 2008

place, we can seek to adopt innovative measures to reduce the impact on greenery and biodiversity. For instance, by linking parks and nature reserves with park connectors and planting suitable trees and shrubs, we can help butterflies and birds to fly from park to park. This is beneficial for species survival as populations of these creatures can be too vulnerable if confined to a single park.

As a step forward, NParks is developing an action plan – the Singapore National Biodiversity Strategy and Action Plan – to conserve our natural heritage for the next 10-15 years. The Plan comprises initiatives in a few key areas.

- **Conservation and rehabilitation programmes:** Under the Plan, NParks will make new efforts to conserve and rehabilitate species, including putting in place monitoring programmes, species surveys, improvements of habitats in Nature Reserves, Nature Areas and parkland and reintroduction of rare species. For instance, NParks will utilise our parks for ex-situ conservation and to house or re-create ecosystems that have been lost. NParks is also studying the development of Eco-links³ between nature reserves. This will help to ensure the survival of species of plants and animals by preventing inbreeding and loss of genetic diversity.
- **Biodiversity considerations in policy and decision-making:** The government will take into account biodiversity issues when making decisions, and adopt holistic approaches towards the conservation of our natural environment. Findings from various research efforts can also enrich our policy making process and help facilitate balanced decision making.



The Chek Jawa Wetlands is home to a rich variety of biodiversity

- **Research and documentation of Singapore's biodiversity and natural environment:** This includes biodiversity valuation studies, research on how to enhance biodiversity in urban settings outside nature areas, a central information portal on biodiversity and a red data list that targets species for conservation.
- **Public education:** NParks will work with non-governmental organisations to promote public awareness and appreciation of Singapore's biodiversity.

³ This eco-link is a wildlife or landscape linkage with the primary function of connecting at least two significant habitat areas to help plants and animals previously isolated in small pockets to spread and interact with other populations.

- **Domestic and international collaboration:** NParks will partner international organisations, public interest groups and private companies to jointly develop the knowledge base and capability to expand conservation efforts. Singapore will also do its part to promote conservation efforts in the region and beyond through various bilateral and multilateral initiatives. For instance, at the 2008 Meeting of the Conference of the Parties to the

Convention on Biological Diversity (CBD), Singapore proposed the development of a self-assessment tool for cities to evaluate the efforts of biodiversity conservation at the city level. In February 2009, Singapore and the CBD Secretariat co-hosted successfully the first expert workshop on the development of the Singapore Index on Cities' Biodiversity.

CONCLUSION

The growth of our city does not have to come at the expense of our quality of life. With careful planning and innovative solutions, our small city state can continue to prosper as a global city and economic hub, yet remain a green and blue playground for all its residents.