
Singapore Botanic Gardens (Singapore) No 1483

Official name as proposed by the State Party

Singapore Botanic Gardens

Location

Singapore (Central Tanglin District)

Brief description

The Singapore Botanic Gardens is situated at the heart of the city of Singapore and demonstrates the evolution of a British tropical colonial botanic garden into a modern and world-class botanic garden, scientific institution and place of conservation and education. Through its well-preserved landscape design and continuity of purpose, the Singapore Botanic Gardens is an outstanding example of a British tropical botanic garden which has also played a key role in advances in scientific knowledge.

Category of property

In terms of categories of cultural property set out in Article I of the 1972 World Heritage Convention, this is a *site*.

In terms of the *Operational Guidelines for the Implementation of the World Heritage Convention* (July 2013), paragraph 47, it is a *cultural landscape*.

1 Basic data

Included in the Tentative List

7 December 2012

International Assistance from the World Heritage Fund for preparing the Nomination

None

Date received by the World Heritage Centre

29 January 2014

Background

This is a new nomination.

Consultations

ICOMOS consulted its International Scientific Committee on Cultural Landscapes and several independent experts.

Comments about the evaluation of this property were received from IUCN in December 2014. ICOMOS carefully examined this information to arrive at its final decision and its March 2015 recommendation; IUCN also revised the presentation of its comments in

accordance with the version included in this ICOMOS report.

Technical Evaluation Mission

An ICOMOS technical evaluation mission visited the property from 22 to 24 September 2014.

Additional information received by ICOMOS

A letter was sent to the State Party on 19 September 2014 requesting additional information on boundaries, integrity, development, protection and management. A response to the letter was received on 28 October 2014. A second letter, regarding the use of the former economic garden and the comparative analysis was sent to the State Party following the ICOMOS Panel meeting in December 2014. A telephone meeting between the State party and ICOMOS was held on 30 January 2015 at the request of the State Party to clarify some points in ICOMOS' second letter. A response to this letter was received on 23 February 2015. The information has been incorporated below.

Date of ICOMOS approval of this report

12 March 2015

2 The property

Description

The nominated property forms part – 49 ha – of the larger area covered by the Singapore Botanic Gardens, an area of 74 ha that can be accessed via 16 main entrances/gates. Originally laid out in the 1860s, the Singapore Botanic Gardens is located within the centre of the city of Singapore, and demonstrates the evolution of the 1800s British tropical colonial botanic gardens into a modern and world-class botanic garden, scientific institution and place of conservation and education. The gardens also forms a component of a wider green infrastructure network across Singapore, which includes over 300 parks, four nature reserves, more than 2,000 ha of tree-lined streets and over 200km of park connectors.

The Botanic Gardens is situated on one of a series of north-south ridges that underlie the Tanglin District of the city. The highest areas of the property rise relatively steeply to over 30 metres above sea level and include Bandstand Hill (the historic core of the Botanic Gardens), a tract of primary rainforest, Burkill Hall and the National Orchid Garden, and the area now primarily occupied by NUS's Faculty of Law and associated houses. The latter were originally erected as part of the former Raffles College and today form part of the nominated property. The topography of the site, together with the tree cover and vegetation, enhance the constant sense of enclosure experienced by visitors.

Trees and plant specimens are an important component of the nominated property, contributing strongly to its character and overall structure. The site contains a wide variety of trees of varying ages, planted for scientific/botanical research, conservation and/or

horticultural/aesthetic purposes. A number of trees are over 100 years old and some pre-date the site's creation. 44 trees have been designated as Heritage Trees.

The nominated property is divided into four zones which are described below.

Tanglin Core (Historic Zone)

This zone is the approximate site of the original 'Pleasure Gardens' and includes the Tanglin Gate, the main historical entrance to the Gardens, originally a road entrance but now restricted to pedestrians. Niven's paths, ring roads, sweeping lawns and Swan Lake (1860s) still reflect his response to the topography and the influence of the English Landscape Style. Other elements located in this zone include: Display Gardens (i.e. the 1980s Vanda 'Miss Joaquim' display, 2004 Sun Garden, 2005 Bonsai Garden and 1929 Sundial Garden) and a frangipani collection on the gently sloping sides of the Bandstand Hill (Character Area 5) with its decorative white painted Bandstand (1930) at the top. Bandstand Hill, which formed part of the 1860s design of the pleasure gardens, commands the highest point in the original area of the nominated property. The layout of the Sundial Garden, Sun Garden and Bonsai collections all contrast with the more informal landscape surrounding them.

Swan Lake (Character Area 1) is located at the foot of sloping lawns with a wide variety of specimen and veteran trees. Although tropical in appearance, the lake was designed to emulate British pleasure gardens/public parks, with a wide promenade following a large water body and scattered trees set within mown grass. The Marsh Garden, laid out in 1969, is located to the south and incorporates the remnants of a rhinoceros wallow and alligator ponds from the late 19th century when the Botanic Gardens contained such zoological collections. The water supply for Swan Lake originates from the Tyersall Learning Forest, entering the site in the area known as The Dell, located near the Swan Lake's northern edge.

The Ginger Garden (Character Area 6) showcases over 550 different types of gingers and species in the related families of the *heliconias*, bird-of-paradise, bananas and arrowroot. The Halia restaurant complex, opened in April 2001, occupies the northern end of this Ginger Garden.

The Botany Centre and Green Pavilion (Character Area 3), which were built in 2006, feature Singapore's first pitched green roof and accommodate research facilities and the visitor information centre. An imposing veteran tree, *Calophyllum inophyllum*, which influenced the layout of the Botany Centre, stands at its centre. Ridley Hall (1882) is located immediately to the north of the Botany Centre. The administrative/research centre of the Botanic Gardens has been located in this part of the Botanic Gardens since the late 19th century.

The Potting Yard area (dating from the 1880s), Fernery Garden (1980), Aroid Garden (1999) and Plant House Garden (first established in 1882 and redesigned in the

1950s) are located at the foot of an east facing slope enclosed in dense vegetation, close to Cluny Road (Character Area 4).

The Plant House Garden is more symmetrical and formal in appearance/design than most of the rest of the Botanic Gardens (with the exception of the Sundial Garden). It originally contained a large rectangular 'plant/exhibition house' (completed in 1882 and roofed in 1885) erected to accommodate public flower shows and displays of potted plants and annuals (some of which were for sale). It now comprises a grass quadrangle surrounded by pergolas, with a central water lily pond (completed 1958).

North of Bandstand Hill, a raised boardwalk leads visitors through a tract of dense and tall primary rainforest. A total of 300 species have been recorded in the rainforest by the Botanic Gardens' scientists, but many of these are represented by few or solitary individuals. This element of the Botanic Gardens was carefully preserved and integrated into the landscape from the outset.

In the additional information the State Party provided at the request of ICOMOS, the State Party highlighted that the exact spot where rubber was first established in 1877, before being planted in the Economic Garden in or after 1879, is included in the heritage core of the Botanic Garden. In celebration of the 100th anniversary of its introduction, a monument was erected at the exact area in the north end of the Palm Valley.

Central Core (Tourism/administration Zone)

Once part of the Economic Gardens, this zone now includes primary tourist attractions – the Visitor Welcome Centre Plaza/Palm Court and amenity facilities, parking and drop-off zone at the Nassim Gate on Cluny Road; NParks headquarters buildings; the National Orchid Gardens and the historic Palm Valley. Most of this area was redeveloped during the 1990s following the 1980s Master Plan. Key veteran trees and heritage buildings and features were retained.

E.J.H. Corner House, a traditional black and white style bungalow completed in 1910 is set among lush tropical planting and includes a small domestic scale garden. A diverse collection of palms contiguous with those of the nearby Palm Valley is located on the south side of the house.

Palm Valley (Character Area 8), planted from 1879 on the site of the former Economic Garden developed under Murton's superintendence, stretches northwards from Orchid Plaza, sloping down to Symphony Lake. This large expanse of grass, with multiple scattered mature palms of varying sizes (c.220 species represented) and other tree species, is located in a shallow valley between the Rainforest and the National Orchid Garden whose eastern side once included part of the original extent of Palm Valley. Symphony Lake dominates the northern end of Character Area 8, with the Shaw Symphony Stage, built in 2005 to replace an earlier stage erected in 1995. The

Lake provides a focal point in views along the valley. An arrow installed in 1974-76 points towards Greenwich, London and marks the location of a temporary station for the observation of terrestrial magnetism set up in the Gardens in 1914. A series of beds located along Heliconia Walk (to the east, dated 1998) showcase the larger growing and more spectacular species of this genus.

The National Orchid Garden (Character Area 9) is the largest permanent display of orchids in the world, and was designed to showcase the products of the Botanic Gardens orchid breeding programme. It was completed in 1995 and is sited on the side of the hill where Burkill Hall (1868), a black and white plantation style bungalow, is located. The misthouse (1995), bromeliad enclosure (1995) and cool house (2004) provide further specialist tropical display gardens within the National Orchid Garden. The latter houses an artificially controlled montane tropical cloud forest display with trees and rocks draped with orchids and carnivorous plants. The Orchid Plaza at the entrance to the National Orchid Garden provides a key meeting place, overlooking Palm Valley and providing access into the National Orchid Garden to the west and the Ginger Garden to the south.

A small semi-wild remnant of freshwater swamp, the Orchid Nursery and mature trees are located to the north. The latter are mostly assumed to have been transplanted from the former Economic Gardens in the period from 1918 until the early 1920s. Transplanted trees included durian, tamarind, *Diospyros blancoi*, mahoganies (African and American), *Erythrophloeum guineense* and *Sterculia foetida*. These are now the largest examples of these species in the Botanic Gardens and will be made accessible to the public after the National Orchid Garden undergoes refurbishment during 2014-2018. The Raffles Building (Character Area 11) completed in 1958 and adjacent carpark/food and beverage facility dominate the north-east corner of this zone.

Bukit Timah Core (Education/Learning Zone)

This zone includes the redevelopment of the old Economic Gardens and later the former Raffles College Grounds. Most parts of the zone have recently been established as with themed plant areas and speciality gardens. The Botanic Gardens' plant resources centre (1995, located outside the boundary of the nominated property) for rare plant propagation and acclimatisation, staff training, conservation and education is also located on the northern boundary.

The Eco Lake and its surroundings (Character Area 15) have a gently undulating topography, with small man-made mounds topped with wooden shelters overlooking the lake. It is generally open with views across and to high-rise buildings located beyond the property boundary. The Eco Lake, a naturalistic lake with a shingle shore and swamp plants along its margins, dominates the area. A number of plant collections/display gardens (fruit trees, spices, bamboo/reflexology, trellis garden and foliage

garden) are dotted around the lake providing variety and ornamental interest.

The Jacob Ballas Children's Garden (Character Area 16) was designed and planted from 2004 to 2007 to provide a unique discovery and learning experience in a garden setting for children of up to 12 years of age. Set in woodlands it includes interactive play equipment, indoor and outdoor living classrooms, hands-on gardens, sensory garden and maze. A reception centre and a car park are located to the east of the area.

The Evolution Garden (Character Area 13) was laid out in 2005 on a small open hill, once the site of the workers' houses for the Economic Gardens. It is visually enclosed by dense tree planting. Specimens, outcrops of rocks, large boulders and fossils (some real and some artificial) border both sides of the main path spiralling to the base of the hill, giving it a distinctive character. Its south-western and eastern edges contain older plantings of timber trees.

Completed as a new speciality garden in 2011, the Healing Garden (Character Area 12) replaced college land bearing derelict university outbuildings, a few large trees (retained) and some smaller trees, shrubs and lawn. The Healing Garden is located adjacent to the old university houses and is laid out over sloping and terraced ground facing south-east. A complex of winding paths leads the visitors through generally new plantings (which includes highly floriferous herbaceous species) interspersed with tall tree specimens (including veteran trees such as *Palaquium obovatum*, planted by Ridley in the then Economic Gardens) which give it a distinctive character. 500 species of plants used for traditional medicine in Southeast Asia are laid out in the shape of the human body. This garden surrounds the former Economic Gardens historic Field Assistant's House (House 6, completed in 1919) and includes mature oil palms dating from c.1920, likely to have been planted as sources of seed for the nascent plantation industry at the time.

Five houses and their setting (Character Area 14), originally constructed between 1924 and 1928 for the former Raffles College, are located along the edge of a hilltop (set back against the Botanic Gardens' boundary), which slopes down steeply to the west. This part of the zone, unlike the younger planting to the north, contains numerous mature trees (including old tembusu trees and palms dating back to the 1920s). The Garage (built around 1924 and 1928) is located at the foot of the hill below the five houses, with old nutmeg and durian trees in between. The Fragrant Garden completed in 2013 (replacing derelict university out-buildings) wraps around House 5 and contains new plants including diverse shrubs and herbs with sweet-smelling flowers. Chinese tombs (1842-81) set within an open grass lawn with scattered shrubs and trees are located to the north-east of the zone.

Tyersall Learning Forest Core (Education/Learning Zone)

This whole zone comprises a century-old dense secondary forest overgrown with laurel, Albizia and towering tembusu trees, some of which were planted in 1862. Recently added as an extension to the Botanic Gardens, this zone will be developed into a 'learning forest'. This will involve the conservation of existing biodiversity, curation of botanical collections, establishment of better connectivity with the Rainforest, repositioning of the existing Tyersall Avenue, restructuring of visitor access to the National Orchid Garden/Ginger Garden, creation of fresh water swamp forest and extension of the National Orchid Garden nursery. It is anticipated that this project will be completed by the end of 2015.

History and development

The extent and certain components of the internal layout of the Singapore Botanic Gardens have changed over time. Several major phases of development are evident.

In 1859 an Agri-Horticultural Society was granted approximately 22 ha of land by the colonial administration to establish gardens in the Tanglin area. The land was developed into pleasure gardens for the Society's subscribers by Lawrence Niven, a Scottish-born and trained gardener and local nutmeg plantation manager. By 1870, Niven had transformed the land into an attractive landscape laid out in the English Landscape style, complete with curving paths, a lake, flower beds, a band parade area and a conserved tract of virgin rainforest. According to the State Party, the design of the Botanic Gardens had little scientific input during this first phase of its history. In 1866 it was extended by a further 12 ha to the west and north-west. A black and white bungalow (today known as Burkill Hall) and Swan Lake were established on this newly acquired land.

In 1874, due to the serious financial difficulties of the Agri-Horticultural Society, the British colonial government assumed ownership and management of the Singapore Botanic Gardens. From this time, the Gardens was transformed into a typical colonial botanical gardens, superintended by a qualified gardener-botanist, James Murton, who was appointed upon the recommendation of the Royal Botanic Gardens Kew.

During this phase, a library and herbarium were established, a wide array of new plant specimens introduced (including many trees to the south and the first Economic Garden to the north-west) and the Botanic Gardens' role in economic botany developed. The Botanic Gardens contained a significant zoological collection between 1875 and 1878, which was thereafter much reduced and eventually removed from the Botanic Gardens in 1985. Palm Valley was established in 1879 and The Dell in 1882 with the latter under the

supervision of the Botanic Gardens' new Superintendent Nathaniel Cantley.

In 1879, an area of approximately 41 ha of Military Reserve land located adjacent to the northern boundary was annexed to the Botanic Gardens and developed into an economic/experimental crops area (known as the Economic Gardens). At this time, the area of the Botanic Gardens was at its largest, encompassing 75 ha of land. Cantley and subsequent Directors continued to develop the Economic Gardens until the 1920s when much of this area was redeveloped into Singapore's first higher education college.

Extant buildings/structures constructed between 1880 and the early 1920s include: Ridley Hall (1882), E.J.H. Corner House (1910), House 6 (the Field Assistant's House, 1919) and Holttum Hall (1921). Cantley also developed the Potting Yard nursery to supply trees for city parks and forest reserves in c.1882-84.

In order to conserve some of the most valuable plants from the Economic Gardens, a number were moved to the historic core of the Gardens between 1918 and the mid-1920s. After the development of the college, the area of the Botanic Gardens was reduced in size to c. 40 ha.

Extant buildings/structures associated with the former Raffles College include: Houses 1-5 (1924-28) and Raffles Hall (now known as Raffles Building, dated 1958). Approximately 13 ha of land that had once formed part of the Economic Gardens was eventually returned to the Botanic Gardens in 1986, and a further 12 ha was added in 2004/2005.

Relatively minor landscape developments took place between the mid-1920s and 1960s. These included: the creation of an Orchid Enclosure (where the Ginger Garden now stands) and the redevelopment of a former Rose Garden in 1929 into the Sundial Garden. An active orchid hybridisation programme was started in the late 1920s and the bandstand was erected in 1930.

Between the early 1960s and late 1980s the Botanic Gardens revised its mission and focus from a research-oriented organisation to one that would feature prominently in Singapore's 'Garden City' vision. In part, the Gardens resumed its earlier roles, propagating trees for planting in Singapore's streets and parks. Taxonomic research was not a priority during this period. Parts of the Botanic Gardens were turned into nurseries and a School of Ornamental Horticulture was opened in Burkill Hall.

A number of new features, such as a Japanese Garden and miniature waterfall, were added to the Botanic Gardens during the 1970s but, with the exception of Symphony Lake, these were later removed (when the Botanic Gardens underwent a major programme of works in line with the National Parks Board's Masterplan, unveiled in 1989).

A 30-year Masterplan for the Botanic Gardens was unveiled in 1989, one year after the appointment of Dr Kiat W. Tan as its new Director. It enabled his new vision for the site to be articulated through a range of proposals grouped according to three core areas (the Bukit Timah, Central and Tanglin Cores) and delivered in three phases. Excellence in botanical research and conservation, education programmes and the protection of the heritage features of the Gardens underpinned the Masterplan. The Botanic Gardens regained its status as an institution for botanical and horticultural research, and is a tourist destination.

New elements introduced through the implementation of the Masterplan include the creation of the National Orchid Garden (1995), Visitor Centre/Park Headquarters (1998), Ginger Garden (2001), Evolution Garden (2005) and Healing Garden (2011). The scientific collections and facilities were also enhanced through the construction of the Botany Centre (2006), which houses the herbarium, library and various laboratories. More recently, works have included the creation of the Fragrant Garden (2013) and Heritage Museum (2013). The development of the Tyersall Learning Forest on approximately nine hectares of land added to the Botanic Gardens' south-western boundary in 2006, is expected to be completed by 2015.

3 Justification for inscription, integrity and authenticity

Comparative analysis

In the context of tropical colonial botanic gardens, the State Party considers that South and Southeast Asia is notable. According to the State Party, the pioneer work done in this region steered the course of history in new directions, revolutionised trade and established economies, influencing the international power balance. Against this notion, the comparative analysis provided by the State Party compared the Singapore Botanic Gardens with historic tropical colonial botanic gardens within South and Southeast Asia, namely, Bogor Botanic Gardens and its extension Kebun Raya Cibodas Botanical Gardens in Indonesia (Dutch); Royal Botanic Gardens Peradeniya and its lowland and highland sister gardens, Henarathgoda and Hakgala, Sri Lanka (Dutch); Calcutta Botanic Garden, India (British); Hong Kong Zoological and Botanical Gardens (British); Yangon Botanic Garden, Myanmar (British); Sir Seewoosagar Ramgoolam Botanical Garden Mauritius, and Penang Botanic Gardens, Penang Island, Malaysia (British).

In this comparative context, the State Party argues that the Singapore Botanic Gardens (SBG) is outstanding for its preserved landscape design and continuity of purpose since its establishment in 1859. The State Party also considers that the Singapore Botanic Gardens is an intact example of the British colonial botanic gardens as the others included in the comparison have lost some of their original features/functions. Finally, the State Party also considers that the Singapore Botanic Gardens is

relatively well-resourced compared to the other identified colonial tropical gardens in the region.

ICOMOS considers that this comparison is appropriate as only a few British tropical colonial gardens are comparable to the purpose and contribution of the Singapore Botanic Gardens, especially in relation to the pioneering work on rubber plantations.

The State Party also compared the Singapore Botanic Gardens with gardens in other regions already inscribed on the World Heritage List, namely, Orto Botanico, Padua (Italy); Royal Botanic Gardens, Kew (United Kingdom); and Jardim Botânico, Rio de Janeiro (Brazil). With the exception of the Kew Royal Botanic Gardens, which shared a mutually dependent role with the Singapore Botanic Gardens, the other two gardens were in the view of the State Party substantially different from the Singapore Botanic Gardens in terms of their values.

ICOMOS considers that the comparative analysis is adequate.

Justification of Outstanding Universal Value

The nominated property is considered by the State Party to be of Outstanding Universal Value as a cultural property for the following reasons:

- The nominated property's landscape today bears testimony to the history of plant transfer and research and the contributions to the economic and social development of the region;
- The Singapore Botanic Gardens is a well-defined cultural landscape which includes a rich variety of historic landscape features that clearly demonstrate the evolution of the Botanic Gardens since its establishment in 1859;
- Since 1875, the Singapore Botanic Gardens has continued to be a leading centre in plant science, research and conservation in Southeast Asia;
- The Botanic Gardens has played an integral role in the social history of Singapore, providing a backdrop for the lives of its residents, both past and present, and a continued sense of place and identity;
- The Singapore Botanic Gardens was and continues to be instrumental in the greening and transformation of Singapore into a 'Garden City/City in a Garden';
- The assemblage of historic landscape features and buildings and conserved lowland primary rainforest, in combination richly illustrate the development and mixed role of the Botanic Gardens during the period of British colonisation.

ICOMOS considers that this justification is appropriate given the ability of the Singapore Botanic Gardens to demonstrate its different phases of design and uses for scientific and social purposes, and through the diverse range of plantings, gardens, buildings and other features.

Integrity and authenticity

Integrity

The State Party states that the nominated property includes within its boundary all elements necessary to express its Outstanding Universal Value as an exceptional example of a British tropical colonial botanic garden in Southeast Asia; and to illustrate interchanges of values connected to ideas, knowledge and expertise in tropical and economic botany and horticulture. According to the State Party, the completeness of the nominated property is demonstrated by the range of landscape features, buildings and structures most closely associated with the Singapore Botanic Gardens as a British colonial botanic garden.

In the additional information provided, the State Party explains that artefacts from Ridley's experimentation with rubber are on display in the Singapore Botanic Gardens Heritage Museum in Holttum Hall. Besides rubber, the State Party asserts that many historic specimens of economic crop species are located on the land of the former Economic Garden within the nominated property. For example, this area still retains 7 very old specimens of African oil palm (*Elaeis guineensis*) planted to produce seeds to establish some of the early plantations in the region, which created a demand for seeds. Also located within the nominated property are two officially recognised Heritage Trees of white gutta percha (*Palaquium obovatum*) which were planted by Ridley in 1897 to ensure the species did not become extinct. These now represent one of the earliest examples of *ex situ* conservation.

ICOMOS considers that the nominated property contains all the attributes needed to demonstrate the proposed Outstanding Universal Value; and that the nominated property fully contains the original layout of the Botanical Gardens.

IUCN states that: "The collection of plants, including the relict small forest ecosystem is at the core of its significance. These plant collections, including herbaria (with over 8,000 type specimens) are considered definitive for the tropics."

ICOMOS concurs with IUCN's views that the integrity of the property could be further strengthened by developing policies directed to ensuring the future integrity of the property, such as a Comprehensive Living Plant Collection Policy.

ICOMOS further considers the move by the State Party to include the Bukit Timah Campus in the Buffer Zone in terms of the Master Plan 2014 as a positive step that will contribute to the maintenance of the integrity of the nominated property (see below).

Authenticity

The State Party states that the key attributes that contribute to the Outstanding Universal Value of the

nominated property – including the landscape, buildings and structures – have high levels of surviving authentic fabric; and that the spatial planning and layout of the Singapore Botanic Gardens are authentic. Many elements of the nominated property are still used in the manner in which they were originally intended, or have been adapted to new uses that are compatible with their values.

In the additional information provided, the State Party referred to the presence of many historic specimens of economic crop species in the former Economic Garden. ICOMOS considers that there are many individual elements that relate to the historical periods of the botanic gardens (as noted above).

ICOMOS notes that the authenticity of the nominated property is maintained on the basis that the site is still used as a Botanic Garden and also a place of scientific research.

In conclusion, ICOMOS considers that the conditions of integrity and authenticity have been met.

Criteria under which inscription is proposed

The property is nominated on the basis of cultural criteria (ii) and (iv).

Criterion (ii): *exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;*

This criterion is justified by the State Party on the grounds that the Singapore Botanic Gardens has been a prominent centre for plant research in Southeast Asia since the 19th century and continues to play a leading role in the interchange of ideas, knowledge and expertise in tropical botany, agricultural economy and horticulture.

This criterion was further justified by the fact that seedling stock from the Singapore Botanic Gardens was used to supply the rest of Southeast Asia as well as smaller plantations in British colonies in Africa and the Caribbean. When the plantation rubber boom began early in the 20th century it was the seeds and saplings supplied by the Singapore Botanic Gardens that enabled most of the expansion of plantations to occur, such that by 1920 Malaya was producing half of the world's latex harvest. Furthermore, China's current rapidly growing rubber industry in Yunnan Province has its origin in trees supplied from Singapore in 1904.

ICOMOS considers that the influences of the Singapore Botanic Gardens has been significant in the history of tropical botany and horticulture, and notes that while the Kew Botanic Gardens supplied the first few seedlings, the Singapore Botanic Gardens provided the conditions for their planting, mass-multiplication, experimentation, agro-industrial development and eventual distribution to much of Southeast Asia and elsewhere.

ICOMOS considers that this criterion has been demonstrated.

Criterion (iv): *be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;*

This criterion is justified by the State Party on the grounds that the Singapore Botanic Gardens is an outstanding example of a British tropical colonial botanic garden and the best preserved of its kind. Compared to the other British colonial botanic gardens of comparable size and function in the tropics, Singapore Botanic Gardens is outstanding for its preserved landscape design and continuity of purpose.

ICOMOS considers that the Singapore Botanic Gardens is an outstanding example of a 'British tropical colonial botanic garden'.

ICOMOS considers that this criterion has been justified.

ICOMOS considers that the nominated property meets criteria (ii) and (iv), and that the conditions of authenticity and integrity have been met.

Description of the attributes

ICOMOS considers that the attributes of Outstanding Universal Value are the numerous trees, plantings and built elements that demonstrate the original extent and layout of the original Botanic Gardens, developed during the 1860s as pleasure gardens; the historical features and gardens in the area of land annexed to the Botanic Gardens in 1866, including the Swan Lake, Burkill Hall and Palm Valley; the trees and other remnant elements of the former Economic Gardens (1879), such as the Field Assistant's house (House 6); the Chinese tombs; buildings which testify to the site's important role in the interchange of ideas, including Holttum Hall and Ridley Hall; the living, preserved, genetic, bibliographic and visual reference collections; the identified heritage trees and very old specimens such as the 7 very old specimens of the species of African oil palm (*Elaeis guineensis*); and the invaluable living and preserved plant collections, which underpin the site's scientific, conservation, educational and recreational functions.

4 Factors affecting the property

The nomination dossier mentions several factors that affect the Singapore Botanic Gardens and its setting. These include developments, infrastructure projects, environmental factors (such as termites and other pests), potential natural disasters and visitation.

ICOMOS considers that the main threats to the property are developments or changes in land use, environmental pressures and tourism.

5 Protection, conservation and management

Boundaries of the nominated property and buffer zone

The boundaries of the nominated property are clearly demarcated and all areas, buildings and features of conservation values within these borders are protected by a range of statutory and non-statutory designations. The nominated property is bounded by Holland Road to the south, Tyersall Avenue/Cluny Park Road to the west, the northern end of the Botanic Gardens to the north and the National University of Singapore's (NUS) Law Faculty/Evans Road and Cluny Road to the east.

A proposed buffer zone around the nominated property defines an area where additional planning guidance will be given to protect the immediate setting of the nominated property.

ICOMOS notes the move by the State Party to include the Bukit Timah Campus in the buffer zone as a positive move. The boundaries of the buffer zone are also clearly marked and much of the land within is designated as 'Landed Housing Areas' (including Good Class Bungalow Areas) with guidelines on the height and building form of residential developments within such areas.

In conclusion, ICOMOS considers that the boundaries of the nominated property and of its buffer zone are adequate

Ownership

All land within the nominated property is owned by the Singapore Government. The majority of the State land within the property is leased to NParks (under a 99 year lease, in force between 1990 and 2089), a statutory body of the Ministry of National Development.

With regard to the buffer zone, the State land immediately to the north and south-west of the nominated property is under the direct management of NParks as part of the Singapore Botanic Gardens. The remainder of land within the buffer zone is under a mix of private and State ownership.

Protection

Areas, buildings and features of conservation value within the nominated property are protected by a range of statutory and non-statutory designations. The principal legislation that regulates conservation and development in Singapore is the Planning Act. Under this legislation, any proposal to develop land or to carry out works in a conservation area (e.g. to erect a new building, etc.) is required to obtain planning and/or conservation permission under the Act before development or work is carried out.

The entire area of the nominated property is within the Singapore Botanic Gardens which is Conservation Area (2008). It is also a Tree Conservation Area (1991) and the

majority of the Gardens is a National Park (1990). The Rainforest Area of the Nominated Property is a Nature Area (2003). There are 44 heritage trees within the nominated property. Conserved buildings within the Nominated Property are houses 1 to 5 of the former Raffles College (2008), Raffles Hall (2006), E.J.H. Corner House (2008), Burkill Hall (2008), Holtum Hall (2008), Ridley Hall (2008), House 6 (2013) and the Garage (2013). Conserved structures within the nominated property are the Bandstand (2009) and Swan Lake Gazebo (2009).

Land within the proposed buffer zone is zoned in the Master Plan for mixed uses such as residential, education and open spaces. ICOMOS notes that much of the buffer zone is designated as 'Landed Housing Areas' (including 'Good Class Bungalow Areas') with guidelines on the height and building form of residential developments within such areas. Under these guidelines, the intention is that developments within the proposed buffer zone should generally maintain low-rise and low density character. Developments in close proximity to the Botanic Gardens are also subject to more stringent height controls under the Building Height Plan that protect the visual amenity of the Botanic Gardens. However, ICOMOS notes that the entire buffer zone is not designated as 'Landed Housing Area', meaning that there are parts of the buffer zone that do not benefit from restrictions of height related to this designation. Therefore, the parts of the buffer zone that are excluded may be exposed to developments that could adversely affect the nominated property.

In conclusion, ICOMOS notes that although Singapore has well-developed planning and development compliance systems, there is concern that the laws of the State Party do not have mandatory environmental impact assessment (EIA) for planning. If this is addressed, protection of parts of the buffer zone that are not designated Landed Housing Area could be strengthened. Generally, ICOMOS considers that the legal protection in place is adequate, with the exception of the areas within the buffer zone that are not designated as 'Landed Housing Area'.

Conservation

The living collection is part of an ongoing and evolving curation programme, which seeks to ensure that research and conservation needs are met, keynote specimens (e.g. heritage or horticultural value) are conserved, the historic character and structure of the landscape is maintained and a quality visitor experience is provided. In accordance with the Gardens' Acquisition and Retention Policy, there is an intention to replace 'low value' plants with new 'higher value' ones and, wherever appropriate, to replace plants with new more accurately documented plant material (particularly in relation to provenance).

The most recent records or inventories of the nominated property are the digital inventory of Living Collections (2013, updated on an ongoing basis); digital inventory of the Library Collection (published and archival material,

2013, updated on an ongoing basis); digital inventory of the Herbarium's Type Specimens (2013, updated on an ongoing basis); digital inventory of Conserved Buildings and Structures, held by the Urban Redevelopment Authority (2013, updated as and when necessary); digital inventory of Heritage Trees, held by the National Parks Board (2013, updated on an ongoing basis); digital inventory of all buildings within the Singapore Botanic Gardens, held by the National Parks Board's Resource Management Division (2013, updated on ongoing basis); and Biodiversity survey of the Rainforest (2009-2012).

The historic buildings in the Singapore Botanic Gardens are inspected on a quinquennial basis and subject to ongoing maintenance. ICOMOS considers inspections that are undertaken once every five years to be inadequate as a conservation measure.

In conclusion, ICOMOS considers that the conservation measures are generally adequate, but that they could be strengthened through improvements to the frequency of inspections of the historical buildings.

Management

Management structures and processes, including traditional management processes

The overall responsibility for the management of the Botanic Gardens lies with its Director who is assisted by two senior Deputy Directors and four Deputy Directors. The Singapore Botanic Gardens currently employs 125 full-time members of staff. Volunteer workers lead walks around the Gardens, including a specialist heritage walk. Garden staff are employed in the following five departments: Research and Conservation; Horticulture, Exhibitions and Events; Education, Development and Administration Support; Visitor Management, Security and Operations; and Singapore Garden Festival.

Policy framework: management plans and arrangements, including visitor management and presentation

Land use planning in Singapore is carried out by URA, the national land use planning and conservation authority, in conjunction with other government agencies. The strategic land use plan that guides Singapore's development over a 40 to 50 year period is the Singapore Concept Plan. This plan is supported by the Master Plan (2008) which is the statutory land use plan prepared under the Planning Act. The Master Plan translates the broad long-term strategies of the Concept Plan into detailed plans to guide development, and sets out land use zoning and plot ratio/intensity policies for land in Singapore. Development control plans such as Landed Housing Area Plans and Building Height Plans referred to above are published to provide further elaboration and guidance of the planning intention of the Master Plan. The review of the Master Plan is carried out at least every five years.

The nominated property is zoned 'Park' in the Master Plan, which requires that the land be set aside for use as park or garden, for the enjoyment of the general public. The Conservation Guidelines provide the conservation principles, planning parameters and restoration guidelines for conserved shop house and bungalow typologies, as well as planning parameters and envelope control guidelines for new buildings within Conservation Areas. To safeguard the visual amenity of the nominated property, the Building Height Plan also provides for more stringent height controls on developments in close vicinity of the Singapore Botanic Gardens.

A Management Plan has been prepared for Singapore Botanic Gardens with the primary aim of ensuring effective protection, conservation, presentation and transmission of the attributes of the site's Outstanding Universal Value. The Plan provides the over-arching framework for management of the nominated property.

ICOMOS also notes the Master Plan 2014, gazetted on 6 June 2014, is Singapore's latest Master Plan and supersedes the above-mentioned 2008 document that was submitted with the Nomination Dossier.

IUCN recommends that: *"an effective management plan for the remnant primary forest within the boundaries of the nominated property be maintained and kept updated, as it is unlikely that this relatively small patch of forest will be sustained over time if left unmanaged, and that its character may adapt over time due to the process of management intervention required to sustain it."*

The Botanic Gardens are free to access, with the exception of the National Orchid Garden, and are believed to be the only botanic gardens in the world that is open until midnight every day. To facilitate presentation of the significant value of the nominated property, amongst others, educational signs are erected in the vicinity of each Heritage Tree. The Botanic Gardens contains a range of visitor facilities/infrastructure.

A user survey was recently commissioned, which will outline the site's visitor profile as well as visitor satisfaction, needs and aspirations.

Involvement of the local communities

There are currently no inhabitants within the nominated property and about 3,788 living in the buffer zone. A wide range of stakeholders were consulted and contributed to the development of the Nomination Dossier including the Management Plan. These stakeholders included the Tanglin Neighbourhood Committee.

In conclusion, ICOMOS considers that the management system for the property is adequate.

6 Monitoring

Indicators for quantitatively and qualitatively measuring the state of conservation are established in the

Management Plan for the nominated property. These include:

- Percentage of buildings/structures requiring major repair
- Observed change in the condition of the living collections
- Number of major changes to the historic layout
- Population size of key species in the Rainforest
- Observed change in the condition of the preserved collections
- Observed change in the condition of the documentary/visual reference collections
- Continuity of the site's scientific and recreational functions
- Percentage of visitors expressing satisfaction
- Number of participants in educational activities

While ICOMOS considers that these indicators are adequate to monitor the state of conservation of the property, the State Party should also include further indicators related to the impact of tourism and potential impact from development. The State Party should also provide further information on the procedures for the monitoring of the property.

In conclusion, ICOMOS considers that the monitoring and indicators are adequate, but that these should be augmented by additional indicators related to the impacts of tourism and development on the Outstanding Universal Value of the nominated property.

7 Conclusions

ICOMOS considers that the significance of the Singapore Botanical Gardens as an exceptional example of a British tropical colonial botanic garden in Southeast Asia; and an illustration of interchanges of values connected to ideas, knowledge and expertise in tropical and economic botany and horticulture.

8 Recommendations

Recommendations with respect to inscription

ICOMOS recommends that the Singapore Botanical Gardens, Singapore, be inscribed on the World Heritage List on the basis of **criteria (ii) and (iv)**.

Recommended Statement of Outstanding Universal Value

Brief Synthesis

The Singapore Botanic Gardens is situated at the heart of the city of Singapore and demonstrates the evolution of a British tropical colonial botanic garden from a 'Pleasure Garden' in the English Landscape Style, to a colonial Economic Garden with facilities for horticultural and botanical research, to a modern and world-class botanic garden, scientific institution and place of conservation, recreation and education. The Singapore Botanic

Gardens is a well-defined cultural landscape which includes a rich variety of historic landscape features, plantings and buildings that clearly demonstrate the evolution of the Botanic Gardens since its establishment in 1859. Through its well-preserved landscape design and continuity of purpose, the Singapore Botanic Gardens is an outstanding example of a British tropical botanic garden which has also played a key role in advances in scientific knowledge, particularly in the fields of tropical botany and horticulture, including the development of plantation rubber.

Criterion (ii): The Singapore Botanic Gardens has been a centre for plant research in Southeast Asia since the 19th century, contributing significantly to the expansion of plantation rubber in the 20th century, and continues to play a leading role in the exchange of ideas, knowledge and expertise in tropical botany and horticultural sciences. While the Kew Botanic Gardens (United Kingdom) provided the initial seedlings, the Singapore Botanic Gardens provided the conditions for their planting, development and distribution throughout much of Southeast Asia and elsewhere.

Criterion (iv): The Singapore Botanic Gardens is an outstanding example of a British tropical colonial botanic garden, and is notable for its preserved landscape design and continuity of purpose since its inception.

Integrity

The Singapore Botanic Gardens contains all the attributes necessary to express its Outstanding Universal Value and fully contains the original lay-out of the Botanic Gardens. A number of specific attributes including historic trees and plantings, garden design, and historic buildings/structures combine to illustrate the significant purposes of the Singapore Botanic Gardens over its history. The integrity of the property could be further strengthened by developing additional policies directed at the replacement and retention of significant plants.

Authenticity

The authenticity of the Singapore Botanic Gardens is demonstrated by the continued use as a botanic garden and as a place of scientific research. The authenticity of material remains in the property is illustrated by the well-researched historic trees and other plantings (including historic plant specimens), historic elements of the designed spatial lay-out, and the historic buildings/structures which are being used for their original purposes or adapted to new uses that are compatible with their values.

Management and Protection Requirements

Most of the Singapore Botanic Gardens is in a National Park, and the other designations include: Conservation Area, Tree Conservation Area and Nature Area (applied to the rainforest area). There are 44 heritage trees within the nominated property, and a number of protected

buildings/structures such as houses 1 to 5 of the former Raffles College, Raffles Hall, E.J.H. Corner House, Burkill Hall, Holttum Hall, Ridley Hall, House 6, Garage, Bandstand and Swan Lake Gazebo.

The Botanic Gardens is protected primarily through the Planning Act of Singapore, which regulates conservation and development and requires permits to be obtained for new development or works. The Singapore Concept Plan guides strategic planning over a 40-50 year period and land use planning in Singapore is carried out by URA, the national land use planning and conservation authority. Land use, zoning and development policies for Singapore are established by a statutory Master Plan (2014) prepared under the Planning Act. The Master Plan is regularly reviewed and there are provisions for specific development control plans that provide guidance on the height and location of new developments as well as conservation principles for conserved buildings and their setting.

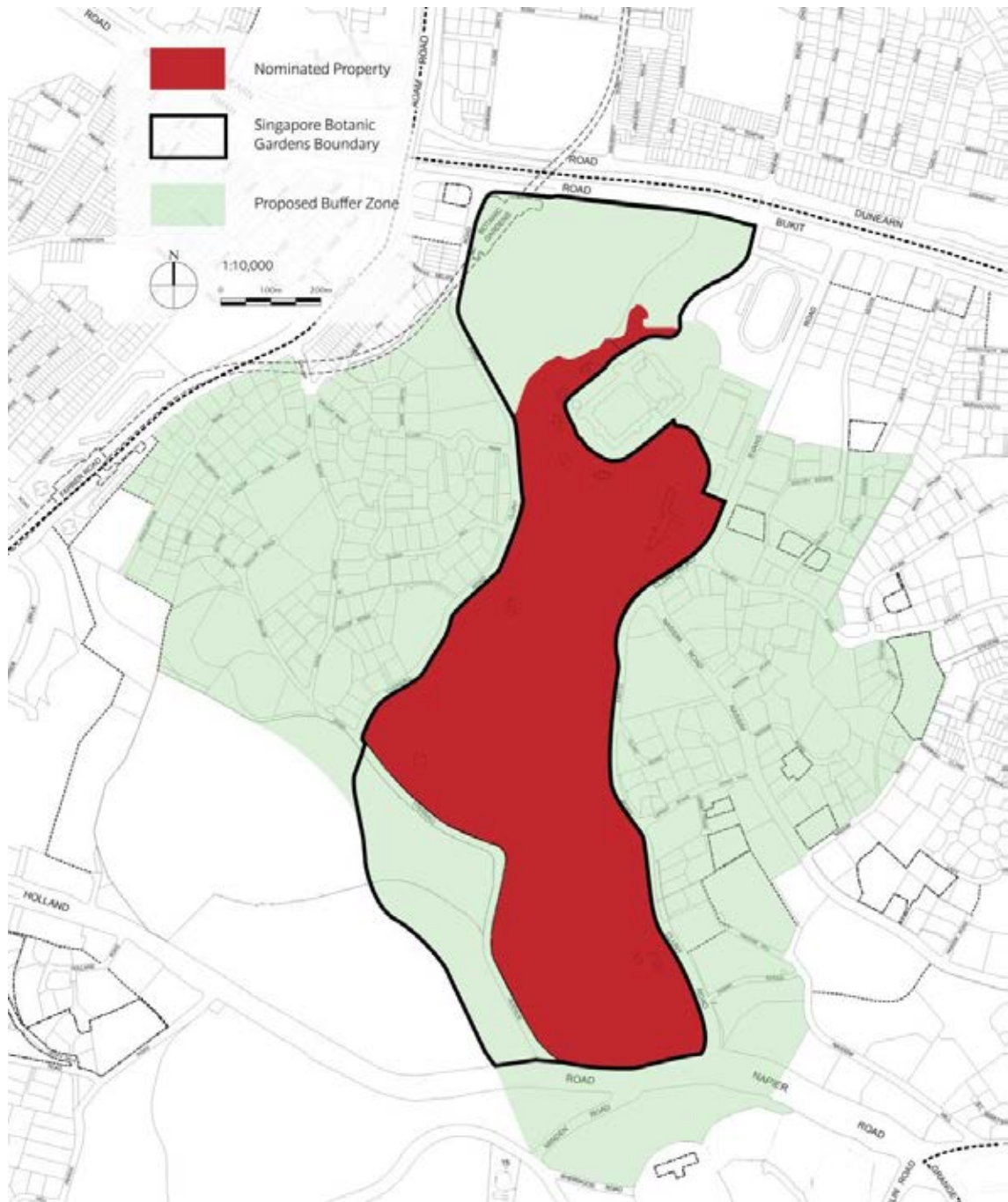
Land within the buffer zone is designated as 'Landed Housing Areas' (including 'Good Class Bungalow Areas') with guidelines on the height and building form of residential developments. Under these guidelines, developments within the proposed buffer zone should generally maintain low-rise and low density, although this could be strengthened by ensuring that the 'Landed Housing Zone' is applied to the entire buffer zone.

A Management Plan has been prepared for Singapore Botanic Gardens with the primary aim of ensuring effective protection, conservation, presentation and transmission of the attributes of the site's Outstanding Universal Value. The Plan provides the over-arching framework for management of the nominated property.

Additional recommendations

ICOMOS further recommends that the State Party give consideration to the following:

- Strengthening the protection of the buffer zone by applying the 'Landed Housing Zone' to its entirety, or by providing some other appropriate measure that can restrict the height of new constructions;
- Strengthening the conservation measures through improvements to the frequency of inspections of the historical buildings;
- Developing monitoring indicators for development and tourism in light of the growing impacts from these potential threats;
- Ensuring that all new proposals for development are submitted to the World Heritage Centre for examination in accordance with paragraph 172 of the *Operational Guidelines for the implementation of the World Heritage Convention*;
- Formulating a Living Plant Collections Policy and Plant Acquisition and Replacement Policy.



Map showing the boundaries of the nominated property



Swan Lake



The Bandstand



The National Orchid Garden



Tyersall Learning Forest