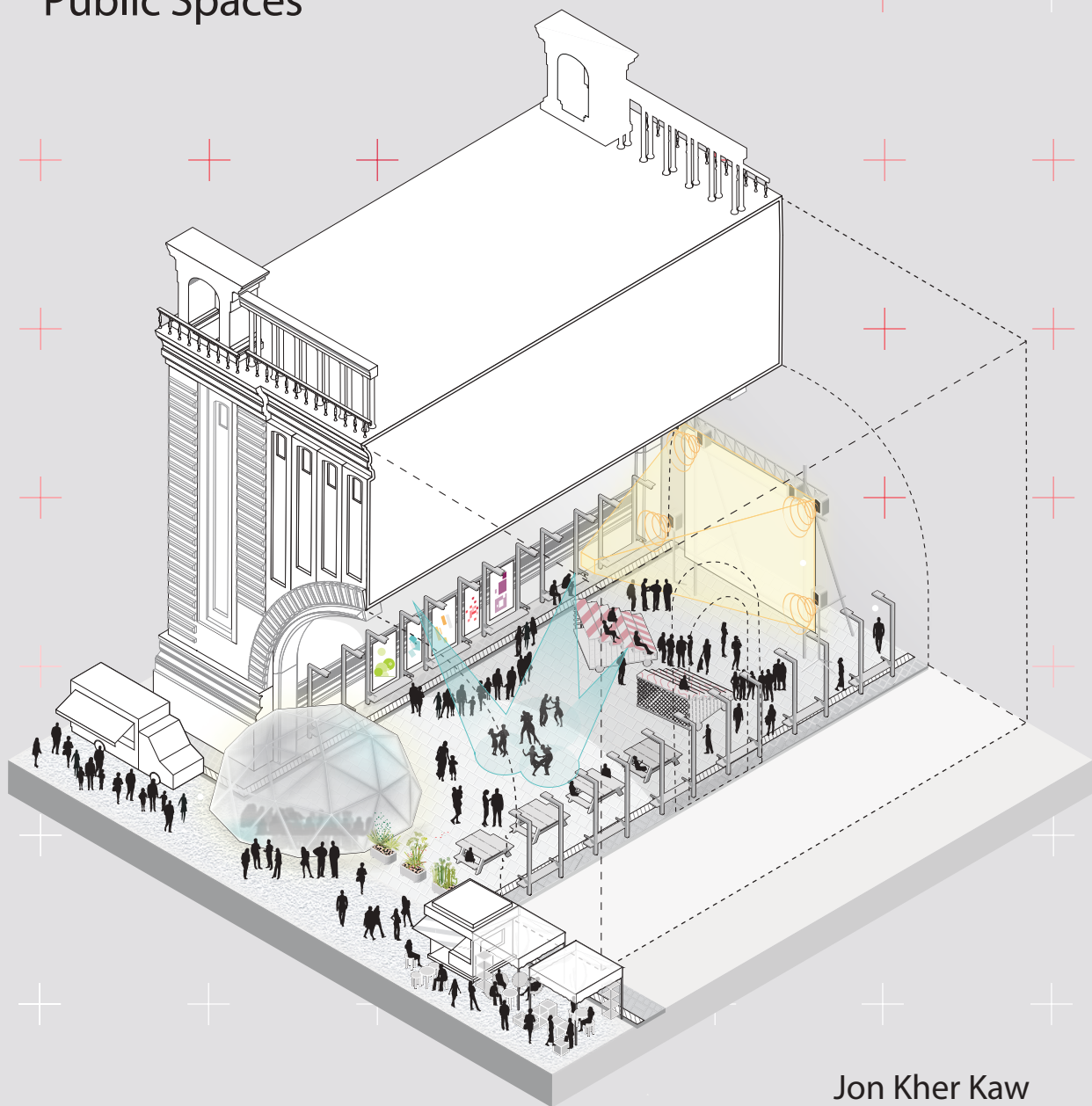# THE HIDDEN WEALTH OF CITIES

Creating, Financing, and Managing Public Spaces

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Sameh Wahba

CHAPTER 15

SINGAPORE: ENHANCING URBAN HEALTH AND VIBRANCY BY LEVERAGING STREETS, PARK CONNECTORS, AND MARKETPLACES

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KEY TAKEAWAYS

- Singapore has undertaken successful efforts to improve livability and vibrancy in a high-density urban setting. The city-state's careful planning and integration of open and green spaces in neighborhoods are studied through three cases: the Park Connector Network, Orchard Road, and Hawker Centers.

- The Park Connector Network (PCN) has creatively transformed underutilized or vacant spaces along roads, overpasses, and drainage reserves into bridging public spaces that link scattered parks. It also provides ecological corridors to attract endemic biodiversity and ensure a conducive environment for both park users and wildlife.

- Orchard Road, a well-designed green and vibrant commercial street, is one of Singapore's most visited free-access attractions. The successful development of Orchard Road was achieved, in part, through the government's efforts to incentivize private sector stakeholders to enhance the overall

streetscape, including by implementing human-scale designs and empha-
sizing pedestrian-focused elements in a high-intensity, dense urban context.

- Hawker centers, originally developed to accommodate unlicensed food
vendors who ply their trade on Singapore's streets, have evolved into inclu-
sive, community-centric spaces for selling clean, affordable, and culturally
diverse foods. Although early hawker centers were stand-alone, functional
developments, the more recently built hawker centers are more sensi-
tively and carefully designed. Many incorporate universal design elements
to meet the needs of the elderly and people with disabilities. A number of
them are co-located with a range of other community-centric amenities
and facilities.

- Key factors in the success of public-space projects are their integration
with long-term neighborhood- and city-level strategies, and the coordi-
nated interagency approach to their implementation. These projects have
been continuously improved over several decades to ensure that they
remain relevant and effective in meeting the needs and enhancing the
quality of life of Singapore's population.

CITY DYNAMICS

Context and Background

Singapore has a land area of 719 square kilometers, a population of just
over 5.8 million people, and a population density of almost 7,800 persons
per square kilometer. As an island nation with no hinterland, Singapore
faces significant land constraints. It is also both a city and a country, and
there is a need to accommodate the needs of a nation state within a rel-
atively limited land mass: apart from the urban infrastructural needs of
housing, transport, and commerce, it also has to allocate land for uses such
as seaports and airports, military training grounds, water catchments, and
industrial parks—all of which are not typically expected or planned for in
a city.

Singapore gained self-governance from Great Britain in 1959. At the time,
much of the country's population of about 1.7 million resided in overcrowded,
ethnically segregated districts in the city's Central Area. The Central Area
also had poor transport connectivity with other parts of Singapore: there was
no urban rail system, and the privately owned network of commuter buses
was badly run and unreliable. Singapore was neither livable nor sustainable:
there were slums, traffic congestion, disease, water shortages, and periodic
flooding.

The government acted quickly to resolve many of these pressing problems.
It established the Housing and Development Board (HDB) and built thou-
sands of affordable new homes; developed infrastructure to provide clean
water to households, industries, and other sectors; cleaned up Singapore's
waterways and waterbodies; acquired and redeveloped districts affected by
urban blight; embarked on an ambitious landscaping program across the
island; and built new roads and highways.

Sixty years on, Singapore's population has tripled, but it is one of the greenest and most livable cities in the world despite its high population density. This is the result of decades of long-term-focused, carefully coordinated urban planning and development. The country's development efforts involved dozens of specialized government agencies adopting a sensitive approach to managing its scarce land resources. Although economic growth has been a critical priority shaping how Singapore manages and uses its land, development has not taken place haphazardly. As far as possible, Singapore's planners have balanced economic growth imperatives with the need to safeguard and enhance livability outcomes. This has manifested itself in several ways, including the establishment of well-planned and attractive public spaces.

Planning Act. Singapore's Concept Plan and Master Plan (both further described below) are statutory land-use plans prescribing the allowable use of each land parcel in Singapore. These plans have legal effect under the Planning Act, meaning that they cannot be arbitrarily amended or revised without proper legal procedure. The Planning Act also prescribes how an individual or corporate body can develop and use any given land parcel. Appropriate approvals must be obtained from the planning authority and other technical agencies before any development can be constructed. At the same time, the Act provides flexibility for prescribed uses to be reviewed and amended upon application from agencies, developers, and land owners; this allows some degree of deviation from established planning parameters but only if there is a demonstrable need. This integrated and formalized planning and development framework guides the finalization and implementation of plans at the national and local scales.

Concept Plan. At the national level, long-term urban policies and infrastructure investment needs are integrated through a common national Concept Plan, which sets out broad land uses over a time horizon of 40–50 years. Updated every 10 years, it determines the overall spatial structure of the country, indicating broad land-use allocations in consideration of long-term population needs and economic growth projections.

Master Plan. The Master Plan translates the Concept Plan in greater detail. This detailed plan prescribes how Singapore's land parcels can be developed to (a) accommodate existing and future needs in sectors such as commerce, industry, housing, and the community; and (b) provide open space and greenery, public amenities, transportation networks, and other forms of infrastructure. The Master Plan has a 15- to 20-year horizon to guide Singapore's development over the medium term and is reviewed every four to five years to respond more nimbly to changes in land-use needs.

In 2019, the government embarked on a review of the Master Plan. The review focused on several key land-use and planning themes, including the creation of livable and inclusive communities. To achieve this, the government will develop new residential precincts that provide a variety of community-centric amenities and vibrant public spaces. It also plans to continue long-standing efforts to conserve the country's natural heritage and expand the islandwide network of parks, sports facilities, and green spaces.

Another theme of the Master Plan is the rejuvenation of "familiar places": districts in Singapore with a strong sense of local identity and familiarity to residents. The government is intending to implement urban planning and design interventions to safeguard and enhance the distinctive qualities of these districts, including through the improvement of existing public spaces and streetscapes.

As with previous reviews, the 2019 review of the Master Plan was undertaken in consultation with government agencies, civil society groups, professional institutes, and private sector experts, among other stakeholders. The plans were also exhibited to the public at the Urban Redevelopment Authority's (URA) headquarters in downtown Singapore, with visitors encouraged to give their feedback and comments. This wide-ranging and meaningful consultation process was intended to ensure that the government's land-use plans incorporate the views of different groups in society and result in outcomes that will meet the needs and interests of the community at large.

At the local level, the URA also maintains detailed plans for selected areas which translate the relatively broader planning vision of the Master Plan in even further detail. These plans are typically applied to areas of significant planning importance, such as the retail corridor of Orchard Road and new Central Business District (CBD) of Marina Bay. Through these plans, the URA imposes specific planning and urban design guidelines covering features such as building height, building form, building edge, pedestrian networks, and vehicular access requirements. These plans enable the URA to take a finer-grained approach to determining the overall physical quality of these districts.

Greening Singapore

Visitors to Singapore are often struck by the amount of greenery and landscaping throughout the city. Indeed, parks, gardens, and greenery are key features in Singapore's urban fabric and central to its development story.

Singapore's early leaders had a vision to develop Singapore into a "Garden City" and embarked on decades of sustained focus and commitment to green the country—seeing this as a necessary move to stave off urban blight and pollution even as Singapore pursued economic growth and industrialization in the decades immediately following its founding as an independent city-state. Singapore also perceived value in the development of lushly landscaped public spaces as a means to spur the growth of the tourism industry as well as enhance the country's attractiveness to foreign investors (photo 15.1). The Garden City Action Committee (GCAC) was thus set up in 1973 to drive this effort by fostering pervasive greenery and establishing a network of green spaces comprising parks, gardens, and nature reserves.

Decades of effective greening efforts have resulted in several positive outcomes for Singapore's population. Today, almost 10 percent of Singapore's land is made up of parks and nature reserves. More than 80 percent of households are within a ten-minute walk of a park. An extensive network of

PHOTO 15.1 **Mass Rapid Transit (MRT) Train Passing through a Lush, Green Area of Singapore**

Source: Jason Goh. License-free image from Pixelbay.

landscaped park connectors extends for more than 200 kilometers, and some 1,000 hectares of bodies of water are open for recreational activity. There are also more than 20 hydraulic engineering and water management projects under the "Active, Beautiful and Clean Waters" program, which have transformed utilitarian concrete drainage canals into attractively landscaped, publicly accessible streams (MND and MEWR 2015).

In many parts of the country, urban design and planning interventions such as the Landscaping for Urban Spaces and High-Rises (LUSH) program have transformed the cityscape in a unique and striking way. Under the LUSH scheme, developers are granted building incentives to integrate landscaping at the ground level, on building rooftops, and in intermediate parts of new developments. Many buildings feature extensive green walls and landscaped façades, roof gardens, and outdoor planters, providing a visual counterpoint to the high-rise, dense urban environment.

These and other efforts to promote urban green cover and landscaping have enabled Singapore's residents to live in a high-quality environment with pervasive greenery. Beyond nature reserves in and around areas such as the Central Catchment Area and Bukit Timah (a planning area and residential estate in the westernmost part of the Central Region), there are extensive park spaces in the heart of the CBD (such as Gardens by the Bay), smaller green spaces in interim spaces between high-rise developments (such as Tanjong Pagar Park), and neighborhood "pocket parks" with fitness and playground equipment for recreation. In many public housing estates, residents are even encouraged to use such spaces for community gardening and small-scale farming.

ORCHARD ROAD

Phase 1: Context

Orchard Road, one of Asia's most famous shopping streets, is often compared with New York's Fifth Avenue and Paris's Avenue des Champs-Élysées. Stretching over 2.6 kilometers, the street extends from Tanglin Road, an upmarket residential area in the west, to Bras Basah Road, which connects to the CBD toward the east (photo 15.2).

Orchard Road started life in the 1830s as a central artery servicing nutmeg and pepper plantations in the vicinity. Over the following decade, as an unknown crop disease triggered a decline in crop yields and agricultural activity in the area, Orchard Road took on a more residential character, with bungalows and shophouses being built on plots formerly used for farming (Abraham 2003).

By the early 1900s, shops and businesses began opening along Orchard Road to serve residents, heralding the start of the area's commercialization. In 1917, the Singapore Cold Storage Company opened a store to distribute food supplies, and the Orchard Road Market provided fresh produce for residents (Cheah 2003). In 1958, the landmark department store C. K. Tang opened on Orchard Road. The district's image as a retail street continued to develop in the 1970s and 1980s, when many more shopping centers were built. With the opening of other commercial developments such as hotels and entertainment centers, Orchard Road established itself as a major shopping, entertainment, and hotel district in Singapore.

Orchard Road was a busy thoroughfare even in the early days of horse-drawn carriages and *jinrikisha* (rickshaws) and was one of the first streets in Singapore to be macadamized in 1912 (Cheah 2003). Motorized traffic replaced these outmoded forms of transport in the following decades, but Orchard Road took on


PHOTO 15.2 **View of Orchard Road, Singapore, from the Junction of Paterson and Scotts Roads**

Source: Jason Goh. License-free image from Pixelbay.

an increasingly pedestrian-oriented character in the 1970s when Stamford Canal, built in the 1960s to alleviate flooding in the area, was covered up to expand public gathering and pedestrian spaces along the street (CLC 2015).

Sidewalks were first built as part of a 1976 state-implemented project to promote pedestrian walkways along Orchard Road. These and other subsequent street improvement projects provided both sides of Orchard Road with the wide pedestrian malls that have become one of the area's most visible characteristics. The pedestrian-oriented character of Orchard Road was reinforced in 1987 with the opening of three underground Mass Rapid Transit (MRT) stations, which significantly improved public transport access to and within the Orchard Road district, burnishing its position as Singapore's preeminent retail corridor.

By the end of the century, Orchard Road had developed a distinct commercial identity encompassing a variety of uses along the street. Retail and commercial developments such as Centrepoint Shopping Centre and Tang Plaza catered to local and overseas shoppers, hotels like the Mandarin Orchard and Hilton Singapore met the needs of tourists and visitors, and recreational complexes like the nightlife-oriented Peranakan Place and Orchard Cinema enhanced Orchard Road's appeal as a premier entertainment area. Mixed-use developments integrating residential uses such as Lucky Plaza and office uses such as Ngee Ann City added diversity and urban texture to the area, as they drew a resident population and office workers to the retail-oriented district (map 15.1).
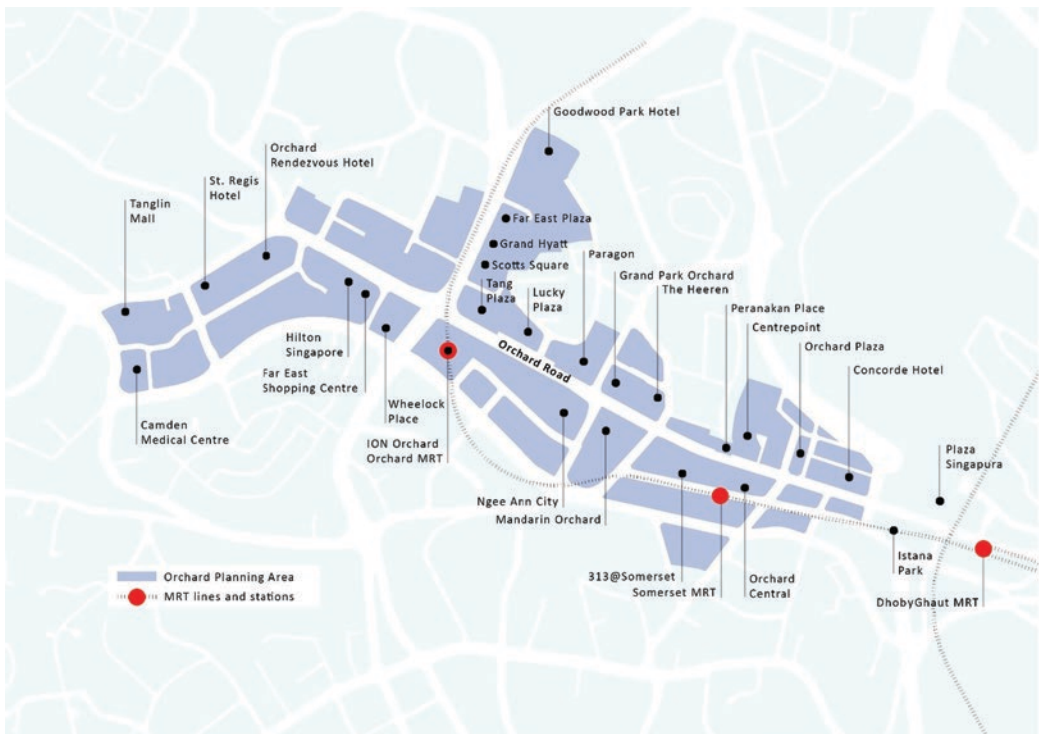
MAP 15.1 **Key Destinations along Orchard Road, Singapore**
Source: ©Centre for Liveable Cities (CLC). Reproduced, with permission, from CLC; further permission required for reuse.
Note: MRT = Mass Rapid Transit.

From the 1960s to the 1980s, Orchard Road's appeal to overseas visitors as a leading retail destination with a wide offering of shopping experiences and attractive prices and merchandise rose in tandem with the growth of Singapore's tourism industry. However, in the early 1980s, Orchard Road's growth was affected by a slump in the tourism industry. In its November 1984 report, the Ministry of Trade and Industry's (MTI) Tourism Task Force assessed that Singapore, in its quest to build a modern metropolis, was losing its "oriental mystique and charm," of which old buildings, traditional activities, and bustling roadside activities were key elements. A strong Singapore dollar and rising cost of living also meant that Singapore was no longer the inexpensive shopping paradise it once was to foreign visitors (CLC 2015).

The tourism industry experienced greater fluctuation and uncertainty in subsequent decades. Global events such as the 1997 Asian financial crisis, the September 11 attacks in the United States, and the outbreak of severe acute respiratory syndrome (SARS) in Asia jolted Singapore's economy, adversely affecting visitor arrivals and tourism revenue over a number of years (Meng, Siriwardana, and Pham 2013). As Singapore's neighboring countries rapidly developed, local retail was also affected by increasing competition from other regional hubs like Kuala Lumpur, Bangkok, and Shanghai (NAS 2004).

Domestically, new malls and commercial centers had proliferated in Singapore's suburban areas since the late 1990s. These new centers were built as part of the decentralization strategy of the 1991 Concept Plan. The plan called for the creation of regional, subregional, fringe, and town centers across Singapore to relieve congestion in the CBD and to bring cultural, recreational, shopping, and entertainment facilities, as well as employment opportunities, closer to residents in newly built housing estates. As a result, although Singapore saw an increase in the amount of retail space islandwide, the bulk of it was located in suburban developments such as Tampines Mall (1995) and Causeway Point (1998)—new shopping complexes popularly known as "Heartland malls"—in the new towns of Tampines and Woodlands, respectively. These two shopping centers alone accounted for more than 100,000 square meters of retail space in Singapore.

At the local level, the government encountered significant challenges in implementing spatial plans to enhance Orchard Road's appeal as a shopping attraction. Historically, Orchard Road had not been planned or conceived as a coherent shopping and entertainment street; rather, the area had grown relatively organically to accommodate a wide range of retail profiles and spatial typologies. Consequently, the area lacked elements such as visual harmony in the design of retail frontages, which can be seen in many major shopping streets in more established retail capitals in Europe. This was not an easy problem to address because much of Orchard Road was already built up, with limited vacant land available for major planning interventions. It was therefore necessary to adopt incremental, creative, and collaborative efforts with development owners to rejuvenate Orchard Road.

Phase 2: Planning and Design

Over a decade starting from the late 1990s, the government implemented several incremental design- and planning-based interventions to improve Orchard Road. These involved efforts such as streetscape improvements and a reshaping of features such as building façades (figure 15.1).

Urban pattern
Frameworks for
land-use and
infrastructure give
order and coherence
to Orchard Road.

Roofscape
Iconic buildings like ION
Orchard provide a powerful,
highly identifiable image
for the street, giving
occupants of high buildings
an interesting view.

Pedestrian network
Seamless system of walkways,
promenades, underground
pedestrian links (orange), and
through-block links provide
practical, safe, weather-proof
and attractive walking
experience along with
activity-generating uses (blue).

Open space
A variety of open
spaces provides
visual relief and
contrast in the built
environment, serving
as public areas and
markers for users.

Streetscape
Building edges, scale
landscape, and street
activities add to the
experience at street
level and give Orchard
Road its unique character.

Vehicular access
Location of vehicular access
points along secondary service
roads minimizes pedestrian-vehicular
conflict and ensures the smooth
flow of pedestrians (orange) and
traffic (brown).

Building form
Variations in height and
volume give Orchard Road
character and visual
interest while responding
to the surrounding context.

FIGURE 15.1 **Integrated Design Components for Orchard Road Improvements, Singapore**

Source: ©Centre for Liveable Cities (CLC). Reproduced, with permission, from CLC; further permission required for reuse.

Tourism and Economic Strategies

Orchard Road has been designated a shopping street in Singapore's land-use master plans since 1958. The improvement of Orchard Road has been coupled with tourism and economic strategies at the city level. A major response to the slump of the tourism industry in the 1980s was a S$1 billion Tourism Product Development Plan—Singapore's first master plan to direct its tourism landscape development over the next decade (STB 2014). Another major thrust to the development of Orchard Road came with the "Tourism 21—Vision of a Tourism Capital" plan in 1997, which sought to capitalize on the rising tourism potential within the Asia-Pacific market in the 1990s by focusing on experiential "software" such as the provision of quality services and programs (CLC 2015; box 15.1). These plans, complemented by other development plans, helped to steer and support the implementation of the broad vision and strategies set out in the tourism plans.

In the late 1990s, zoning revisions resulted in the creation of 55 "local planning areas" across Singapore. Fifty-five Development Guide Plans (DGPs)—one for each local planning area—were consolidated to form Master Plan 1998. The DGP for the Orchard Road Planning Area designated it as a primary commercial and residential belt within Singapore's Central Area (a planning term used to denote Singapore's city center) that included areas such as the Downtown Core. The plan acknowledged Orchard Road's success as the result of a good

BOX 15.1   **TOURISM 21—VISION OF A TOURISM CAPITAL**

A major thrust to the development of Orchard Road came via the 1997 "Tourism 21—Vision of a Tourism Capital" framework, produced by four committees set up in 1995 to facilitate the development of a comprehensive plan to boost Singapore's tourism industry.

Unlike the earlier tourism plan that emphasized "hardware" improvements, Tourism 21 emphasized "software"—specifically, the provision of quality services and programs for tourists (CLC 2015). Along with 11 other popular tourist areas such as Chinatown, Singapore River, and Little India, Orchard Road was identified as a district where existing offerings could be enhanced and repackaged into a variety of tourism products. The plan also proposed ideas to reposition and develop a retail belt extending from Orchard Road to Marina Bay (in the heart of the Downtown Core) as a "Mall of Singapore."

The Tourism 21 plan further recommended "tapping the commercial experience of the private sector" and forming "mutually beneficial partnerships" by creating and supporting stakeholder and trade associations to help oversee future retail development in Singapore. This resulted in the formation of the Orchard Road Committee, a representative body comprising major shopping centers along Orchard Road. This committee evolved into the Orchard Road Business Association (ORBA), a place management organization that works with the Singapore Tourism Board (STB) on collaborative efforts to promote Orchard Road. More than 120 members comprising building owners, retailers, and other stakeholders voluntarily contribute membership fees to ORBA to support events and marketing activities designed to enhance the district's visitor experience and attractiveness.

To foster a pro-business culture and create a conducive operating environment for the tourism industry, the Tourism 21 plan proposed financial incentives in the form of a Tourism Development Assistance Scheme to help local tourism-related companies upgrade their products and services.

In the late 1990s and early 2000s, Singapore's tourism industry faced increased competition from other regional cities. Global shocks such as the severe acute respiratory syndrome (SARS) outbreak further dampened sentiments in the tourism industry. In a bid to revitalize the sector, the Ministry of Trade and Industry (MTI, which oversees the STB) launched the Tourism 2015 plan in

(box continues next page)

mix of office, shops, and hotel uses but highlighted the need for new developments to reinforce existing commercial uses along the street and address the lack of residential population along Orchard Road. The DGP also identified various issues facing pedestrians in the area, setting the ground for a slew of subsequent interventions.

Following the DGP, the URA also introduced a Landmark and Gateway Plan, under which strategically located vacant land parcels, such as those above the underground Orchard MRT station and Somerset MRT station,

BOX 15.1   **TOURISM 21—VISION OF A TOURISM CAPITAL**
             (Continued)

January 2005 to promote tourism growth over the next 10 years. The MTI established a fund amounting to S$2 billion to support initiatives in a number of areas, including infrastructure development, capability development for tourism and retail sector workers, the organization of signature events, and development of unique tourist-oriented products.

As for the development of Orchard Road, various government agencies complemented the broad tourism promotion strategy by announcing a series of initiatives to spruce up the street, including a planned S$40 million investment to expand Orchard Road's public infrastructure. These initiatives included efforts to improve pedestrian walkways and create "urban green rooms" for events. As part of this proposal, three distinct themed zones were created at Orchard Road, each with enhanced road and pedestrian mall lighting that highlighted the district's mature trees and foliage to create attractive night streetscapes. This initiative was driven by an STB-led taskforce comprising agencies such as the URA, the Land Transport Authority (LTA), and the National Parks Board (NParks).

The government's plans to enhance Orchard Road's appeal, including its attractiveness to tourists and Singaporeans, continue to take shape. In recent years, agencies have focused on making Orchard Road a "lifestyle destination," with innovative retail concepts, attractions, entertainment, and events. In 2019, an interagency review of the district's development resulted in a comprehensive approach to split the area into the four subzones of Tanglin, Orchard, Somerset, and Dhoby Ghaut, each with customized strategies to enhance their respective identities. These include positioning Tanglin as an arts- and culture-focused area, Somerset as a center of youth culture, and Dhoby Ghaut as a family-friendly destination.

The 2019 Master Plan further showcased many of these plans, including efforts to improve connectivity across buildings and activate vacant land parcels across the district as locations for pop-up events such as concerts and markets. The Master Plan also highlighted efforts to "Bring Back the Orchard," which would entail the provision of new infrastructure to enhance green spaces throughout the precinct.

Sources: STB 2005, 2014; STPB 1997; URA 2001, 2007.

were identified as potential focal points that could be developed in a way that would make the city center more distinctive and memorable (URA 2001). By redeveloping these vacant parcels, new mixed-use developments incorporating innovative retail concepts and public space began to take shape along Orchard Road. In the case of the vacant site above the Orchard MRT station, planning authorities relaxed existing urban planning rules (for example, on building height), allowing for the development of a 218-meter-high retail and residential development, ION Orchard.

Urban Design Strategies

The URA has introduced a series of urban design guidelines since the early 2000s to guide the physical development of buildings fronting Orchard Road. Over the years, these guidelines have been reviewed, updated, and expanded, taking into account feedback from architects and stakeholders, to remain relevant and pro-business. The guidelines help to shape the visitor experience along the street by providing guidance to developers and property owners on matters such as allowable uses, building forms, pedestrian networks, and vehicular access arrangements.

Shaping Building Setbacks and Edges. Urban Design Plans and Guidelines for Orchard Road were first published in 2002 following a joint STB and URA exhibition to gather public and stakeholder feedback on proposals to enhance Orchard Road (URA 2013b). Key focus areas of the guidelines were façade articulation and urban verandas. The guidelines pushed for changes in building façades to create better physical and visual connections between the street and building activities (figure 15.2) and recommended the use of transparent materials to make shopfront displays more visible and attractive (URA 2005c). Urban verandas, intended as publicly accessible, unenclosed extensions of buildings, were also encouraged.
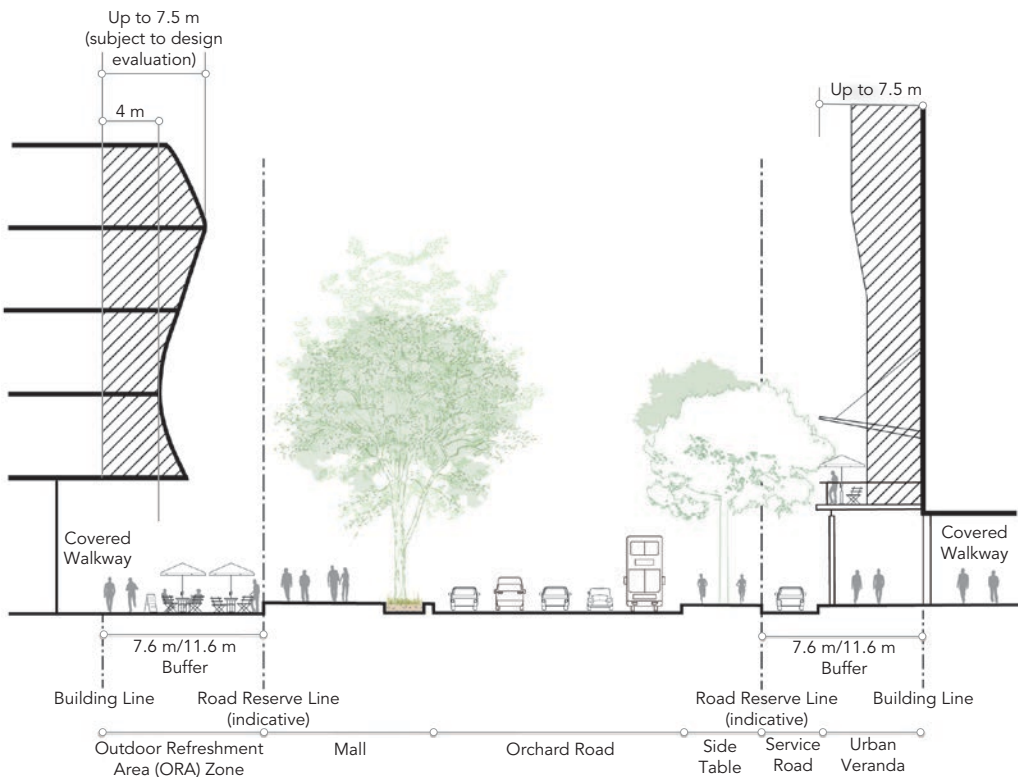

FIGURE 15.2 **Possible Urban Veranda and Façade Articulation Incentives in Orchard Road, Singapore**

Source: ©World Bank, based on Urban Redevelopment Authority (URA). Further permission required for reuse.

The URA extended an incentive to building owners by allowing them to build floor area above the permissible development intensity for such extensions. This prompted many of them to overhaul their properties. For example, Wisma Atria, a commercial development on Orchard Road, announced a S$31 million makeover in the early 2010s to create greater frontage visibility for retailers as well as improved accessibility (Sng 2015).

The guidelines and associated incentives worked well: in the 2000s, "nearly every building fronting the street underwent a façade transformation in return for additional income-producing space," transforming old, familiar retail spaces into new destinations (Anderson et al. 2012). These guidelines shaped and articulated building setbacks along Orchard Road in a way that safeguarded the contiguity of the pedestrian mall and maintained a sense of openness to the street. While ensuring some degree of uniformity at the street block level, the URA's framework of urban design guidelines was flexible enough to accommodate a variety of façade configurations, enabling the creation of diverse visual and spatial experiences along the street.

Reducing Pedestrian-Vehicular Conflict. In the early days, multiple vehicular entrances and driveways to individual buildings along Orchard Road affected the pedestrian experience because there was no continuous promenade. Planning guidelines introduced in the 1980s required new developments to locate vehicular entrances at the rear of buildings. But gaps still remained because these requirements were not imposed on existing developments (Cheah 2003). To address this issue, the DGP 1994 recommended the creation of comprehensive rear service lanes for new developments along the street (URA 2001). This approach was expanded in 2000, when the URA implemented a plan to remove front-facing vehicular access points to several buildings and establish a rear service-road system (CLC and SI 2016).

Gradually, the number of pedestrian-vehicular intersections along Orchard Road was reduced as new development and redevelopment proposals complied with the new guidelines. For example, when the owners of the Mandarin Orchard submitted a redevelopment proposal to the URA in 2009, planners required the hotel to relocate its vehicular drop-off points fronting Orchard Road to the site's western boundary along Orchard Link. Additionally, the hotel lobby was relocated to the upper floors to accommodate more retail uses at the ground level, which would open to Orchard Road (Anderson et al. 2012).

The effect of this was to enhance the porosity of the development and add texture to the promenade through the provision of different shopfronts and window displays. As they were applied from one plot to the next, the building frontage guidelines enhanced the Orchard Road promenade and further improved pedestrians' experience of the area (photo 15.3).

Creating a Comprehensive Pedestrian Network and Active Streetscape. The URA used specific urban design guidelines to provide seamless pedestrian connectivity between MRT stations and key developments. Working closely with building owners and developers, the URA spearheaded plans for the development of a comprehensive pedestrian network at the basement level as well as at the ground or second levels in Orchard Road and other parts of the Central Area. To promote all-weather connectivity, a Central Area Underground Master Plan was drawn up to map existing and

PHOTO 15.3 **Covered Walkways and Urban Verandas at the Ground and Second Floors of Mandarin Gallery in Orchard Road, Singapore**

Source: ©Ken Lee. Used with the permission of Ken Lee; further permission required for reuse.

proposed underground pedestrian links, and private sector stakeholders were incentivized to contribute toward their implementation. In some cases, the URA imposed requirements on developers to incorporate features such as knock-out panels in the walls of MRT stations to provide seamless links between stations and future developments, or through-block links at ground level to create internally permeable street blocks.

To ensure that the pedestrian realm remained vibrant throughout the day, the URA encouraged developers to locate activity-generating uses such as retail, food and beverage outlets, and recreational uses along key pedestrian thoroughfares. The URA exempted these pedestrian thoroughfares from GFA computation, and developers were required to abide by various planning conditions, such as ensuring that these thoroughfares be kept free of obstructions (for example, structural installations) that could hinder pedestrian flow and remain open to the public at all times.

Given that most buildings along Orchard Road were built before mandatory accessibility requirements were introduced in 1990, the Building and Construction Authority (BCA) worked closely with building owners to improve barrier-free access to their premises. This was done through the provision of monetary grants to defray upgrading and construction costs. As a result, about 90 percent of buildings along the Orchard Road shopping belt are currently universally accessible, up from only 41 percent in 2006 (Keung 2018).

These and other interventions helped create pedestrian connections that integrate the diverse uses on Orchard Road in a coherent way. For example, a new through-block connection at 313@Somerset, a commercial development,

serves as a busy pedestrian thoroughfare that not only provides direct access from Orchard Road to the Somerset MRT station but also features various uses that imbue it with a lively, street-like character.

Promoting Roadside and Vertical Greenery. Lush greenery at multiple levels, within both the public realm and private developments, has contributed significantly to the spatial quality of Orchard Road and serves as an important visual signpost of the area's historical incarnation as plantation land. Public spaces along the pedestrian malls were defined by an avenue of *pterocarpus indicus* (commonly known as "angsana" trees), first planted in the 1970s as part of the Garden City Movement that aimed to transform Singapore into a clean and green city (CLC and SI 2016).

In subsequent years, the URA and NParks used numerous guidelines and policies to encourage developers and building owners to provide landscaped areas in their developments. Many of these have been incorporated into the LUSH framework (figure 15.3). Under the LUSH program, the Landscape
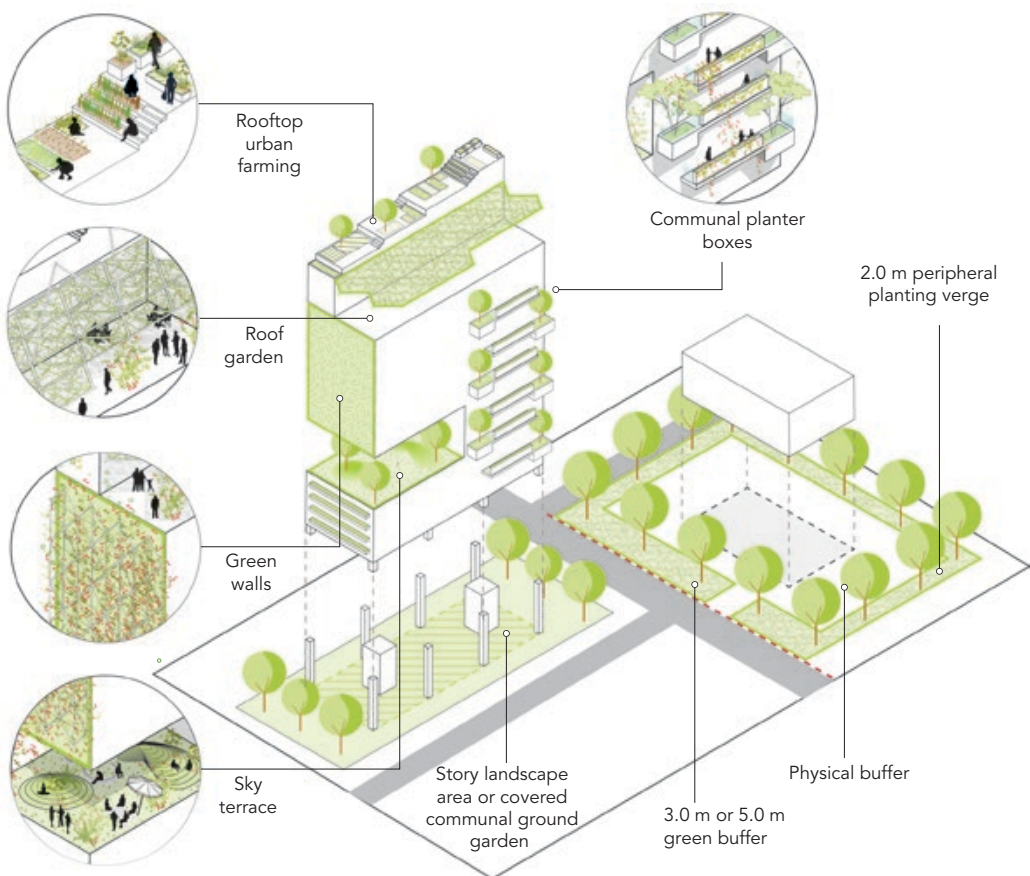

FIGURE 15.3 **Possible Types of Landscape Replacement Areas under the LUSH program, Singapore**

Source: ©World Bank, based on Urban Redevelopment Authority (URA). Further permission required for reuse.
Note: LUSH = Landscaping for Urban Spaces and High Rises; m = meters.

Replacement Area Guidelines for selected strategic development areas in Singapore require developers to replace greenery in the form of landscape areas within the new development project. The total area of landscaped space, which could be provided at ground level, rooftops, or mid-level sky terraces, has to be minimally equivalent to the development site area. In addition, there are also other guidelines on GFA exemptions for communal sky terraces, and GFA incentives for rooftop outdoor refreshment areas to encourage developers to convert their existing roofs into roof gardens or green roofs (URA 2014).

The LUSH program today is complemented by the NParks's Skyrise Greenery Incentive Scheme (SGIS), whereby developers can tap public funds to pay for 50 percent of the cost of installing rooftop and vertical greenery. These initiatives have been adopted by the developers and owners of many developments in Orchard Road, including 313@Somerset and Orchard Central, which feature extensive vertical and rooftop green spaces (NParks 2017).

Looking beyond the Site

As part of the government's 2019 plans for the future development of Orchard Road, agencies highlighted an intention to improve the connectivity of the district's main promenade with surrounding areas. For example, there are plans to enhance the diversity of visitors' experience of the precinct by encouraging them to explore historic side streets such as Emerald Hill and Killiney Road, which connect the main shopping district to surrounding residential enclaves. There are also plans to implement urban design interventions to provide seamless connectivity between Orchard Road and other parts of Singapore through having more mixed-use transit-oriented developments (TODs) sited above the future Orchard MRT interchange station, incorporating the Thomson-East Coast Line (URA 2019a).

Phase 3: Implementation

Agencies are aware that the success of urban planning and design strategies requires the active participation of developers and landowners, particularly in the densely textured, mixed-use context of the Orchard Road precinct. In order to achieve this, agencies have used a combination of incentives and regulations to both encourage and require private sector stakeholders to adopt spatial changes to meet various planning, economic, and social objectives for Orchard Road.

Government Land Sales to Spur Rejuvenation: Clear Guidelines to Ensure Win-Win Outcomes

One of the important ways in which the government has worked closely with the private sector to enhance the Orchard Road precinct is through the sale of state-owned land parcels for new commercial and mixed-use developments. The Government Land Sales (GLS) program, established in 1967, enabled the construction of several landmark developments along

Orchard Road in the 1970s and 1980s, including the Centrepoint, Le Méridien Singapore, and Orchard Plaza.[1] In latter decades, the GLS program proved to be a successful tool in catalyzing the rejuvenation of Orchard Road, especially when the precinct appeared to be ceding its position as Singapore's preeminent retail attraction to newer developments in other areas.

In the mid-2000s, for example, the URA decided to release three new parcels of state land for commercial development to bring new energy and excitement to the area (CLC 2017). These parcels had been kept in reserve for almost 20 years after the MRT stations along Orchard Road opened in 1987, to manage the supply of new commercial space in the area and prevent a glut. By this time, the government assessed that the release of these prime parcels would be a timely move to kick-start a new phase in Orchard Road's development and bolster its prospects as an important retail corridor in the heart of Singapore. Indeed, these parcels have been developed into some of the most popular retail destinations along Orchard Road today.

The URA, as sales agent for the state, sold these land parcels to the private sector for development, with specific guidelines and conditions to ensure that the future developments would respond well to their immediate context and contribute to the success of Orchard Road as a destination. The sales conditions included requirements on the provision of public spaces and pedestrian connections, activity-generating uses, the location of vehicular and emergency access points, and various streetscape improvements. This land sales and development approach allowed the public sector to play a significant role in influencing the forms and functions of new private developments on Orchard Road.

For example, one of the three GLS sites was at the junction of Orchard Road and Paterson Road, occupying a central location ideal for a development that could serve as a visual gateway to the district. In offering the site for sale, the URA sought to realize the potential for the future project to be a landmark development for the district. It decided to relax the prevailing height controls for the site, enabling the construction of ION Orchard, a 218-meter-high complex comprising a retail podium with direct connection to the Orchard MRT station at the basement level and a 56-story residential tower overhead. Today, ION Orchard, on the southeastern corner of the Orchard-Paterson junction, is a striking contemporary visual counterpoint to the 33-story Tang Plaza hotel tower directly across Orchard Road, which was built in 1982 with a traditional Chinese hard hill roof.

The URA also required the development to incorporate cultural and civic uses: ION Orchard houses spaces for events and public activities and an observation deck offering a panoramic view of the surrounding cityscape. In addition, the URA imposed requirements to improve pedestrian connectivity between ION Orchard and other parts of Orchard Road. For example, the developer was required to build a public concourse contiguous with the pre-existing MRT concourse at the basement level. Planning conditions such as this helped create new underground connections between ION Orchard and surrounding buildings like Wisma Atria and Wheelock Place. A public space was also created along the pedestrian mall at the ground level, adding a new civic space to Orchard Road (URA 2005b).

Design Quality

To ensure exceptional urban and architectural design quality, selected strategic projects and key development precincts in Singapore have to go through a Design Advisory Panel (DAP) chaired by the URA. The DAP usually comprises members from the architectural industry along with representatives from other related fields. Under this DAP model, the overall design and layout of all key development proposals at Orchard Road are guided by the panel as part of the formal development control process.

The DAP evaluates each proposal in two stages. In the first stage, the panel considers broad urban design elements, including features related to building form, massing, pedestrian connectivity, vehicular circulation, view corridors, and landscaping. Projects that satisfy the DAP's criteria are then granted provisional permission by the URA, meaning that developers can commence some initial construction work on the development. In the second stage, the DAP reviews more specific elements such as architectural design features, building layout, building materials and finishes, and external lighting plans. Proposals that meet the DAP's review standards at this stage are then granted final planning permission by the URA (URA 2005c).

Incentivizing the Private Sector

The government also introduced incentives to promote place management efforts at Orchard Road. For example, the URA introduced an "Art Incentive Scheme for New Developments in Central Area" from 2005 to 2012, through which developers could obtain additional buildable floor area above the stipulated development intensity for their sites by providing public art installations in their developments. To qualify for the scheme, the art works must be evaluated and endorsed by a Public Art Appraisal Committee convened by the URA and the National Heritage Board (the public agency that manages Singapore's art and history museums), and developers must ensure that the works are accessible for free public viewing (URA 2005a).

The STB also initiated schemes to offset the costs that private sector stakeholders may incur in contributing to the rejuvenation of Orchard Road. For example, the STB supported companies in obtaining tax allowances for establishing flagship concept stores along the shopping street. Developers purchasing selected GLS sites at Orchard Road could also enjoy a remission on the amount paid in Goods and Services Taxes (GST, which is levied on the purchase of commercial real estate, including vacant land parcels), subject to various conditions. Such schemes have created win-win propositions between the private and public sectors, contributing significantly to the rejuvenation of Orchard Road in recent years.

Phase 4: Management

Providing Planning Flexibility to Encourage Redevelopment

To encourage rejuvenation through innovative and high-quality development projects that would enhance Orchard Road as the premier shopping street, the Orchard Road Development Commission (ORDEC) was in place from 2005 to 2015 to evaluate whether major additions and alterations (A&As) or redevelopment proposals, which deviate from the prevailing planning parameters, could be regarded as special innovative projects of high quality that merit the deviations.

The commission, chaired by the CEO of URA with members from other relevant government agencies, was empowered to propose incentives and allow variations in planning requirements to support innovative development ideas. It encouraged the development of projects with unique design concepts, those that enhanced the public realm with benefits to the community, and those that featured innovative business concepts and provided economic development benefits. Based on ORDEC's recommendations of the value brought about by redevelopment, URA supported these redevelopment proposals by granting them various development incentives; for example, projects were allowed to deviate from existing planning parameters such as plot ratios, permissible uses, and building height restrictions (URA 2013a).

More recently, URA introduced the Strategic Development Incentive (SDI) scheme in March 2019 as an expansion of the ORDEC scheme. The SDI scheme applies to strategic developments islandwide and aims to encourage the redevelopment of older buildings in strategic areas into new bold and innovative developments that will positively transform the surrounding urban environment.

Addressing Challenges

Orchard Road currently faces new challenges. The emergence of e-commerce and evolving consumer preferences are rapidly reshaping the brick-and-mortar-centric retail landscape (Koh 2018). As the Singapore government continues to pursue a policy of discouraging private motor vehicle use, there has been extensive discussion on how to further improve the pedestrian experience and rethink Orchard Road's position as a public space (MTI 2017).

Efforts have been made to address these concerns. In September 2017, a committee led by the ministers in charge of urban development, transportation, and industry was formed to drive efforts for the rejuvenation of Orchard Road (MTI 2017). In the near term, there are plans to refresh Orchard Road's streetscapes by activating other vacant parcels of state land in the area. New pedestrian crossings in the form of 30-second scramble walks were tested at selected junctions during late 2017 and early 2018 to improve pedestrian connectivity across Orchard Road (Koh 2018). New retail offerings were also planned to enhance the street's attractiveness as an integrated lifestyle and leisure precinct (STB 2017). These include Design Orchard—a retail-cum-incubation space for Singaporean brands and designers to test and promote their products—which opened in January 2019.

Safeguarding and enhancing Orchard Road's appeal in the face of new challenges is a continuous process, and one that will require close collaboration between agencies, development owners, businesses, and other stakeholders in the precinct.

Place Management

Beyond the physical characteristics of a place, there has been increasing recognition of the need to enhance human vitality, buzz, and identity through a collaborative multistakeholder management process. This process requires the commitment of area stakeholders to improve the management of a precinct, on the basis of a shared understanding that an improved precinct can reap tangible benefits for businesses and property owners.

PHOTO 15.4 **Pop-Up Event at Orchard Road, Singapore**

Source: ©Ken Lee. Used with the permission of Ken Lee; further permission required for reuse.

At Orchard Road, the STB has been working with ORBA to drive place management initiatives to enhance Orchard Road's image as a premier shopping and lifestyle destination. With ORBA acting as the overall place manager, local business owners and other stakeholders have been encouraged to contribute actively through business development, promotion, and marketing activities.

Place management efforts were earlier initiated as part of the STB's tourism promotion drive. But many of these early projects have come to positively affect not only the lives of visitors but also of Singaporeans (Hee 2017). One such initiative is the annual Orchard Road Christmas Light-Up, launched in 1984, which has become a popular event with both tourists and locals.

More recently, pop-up events planned by the STB, ORBA, and other stakeholders have injected vibrancy to Orchard Road (photo 15.4). These include promotional festivals held during the "Great Singapore Sale" each year—when retailers work together on a schedule of events held in public areas and within shopping centers to showcase their products—as well as Fashion Steps Out, when a long stretch of Orchard Road is closed to traffic and converted into an outdoor fashion catwalk.

These events generate excitement and anticipation among shoppers, creating more opportunities to draw visitors and enhance business activity on Orchard Road (Cheah 2003). Similar to place management efforts in other parts of Singapore, public agencies and businesses work together on these initiatives, pooling their expertise and resources.

Phase 5: Impact Evaluation

Orchard Road emerged as Singapore's key retail corridor in the 1970s and 1980s, displacing former commercial hubs centered on areas in the Downtown Core such as Raffles Place and High Street. Over the years, the precinct has

come to play a central role in the development of Singapore's tourism industry and in the country's positioning of itself as a cosmopolitan, open, and friendly destination for regional and international visitors. At the same time, Orchard Road is a familiar, well-loved gathering and recreational spot for generations of Singaporeans from different backgrounds.

In recent years, Orchard Road has faced intense competition from e-commerce and newer commercial precincts in suburban locations and other parts of the Central Area. Indeed, tourism figures suggest that it is ceding ground to other retail attractions. In 2003, nearly 4.6 million visitors—representing 76 percent of all tourist arrivals—visited Orchard Road; by 2016, its share of visitors had fallen to roughly 50 percent (STB 2016). Tourism aside, Orchard Road remains an appealing location for Singaporeans: beyond shopping, a plethora of events draws thousands each month, and well-planned, attractively designed public spaces encourage many to visit, mingle, and socialize.

Retail rental figures suggest that Orchard Road has managed to retain its position as Singapore's preeminent retail draw. Despite the highly competitive retail environment, businesses appear willing to pay an increasingly higher premium to locate themselves in Orchard Road. In the first quarter of 2019, the median rental rate for retail space in the Orchard Planning Area was about S$107 per square meter, or 84 percent higher than the median rental rate for retail space in other parts of the Central Area. In the first quarter of 2014, five years prior, Orchard Road rentals outstripped those in other parts of the Central Area by a more modest 63 percent (URA 2019b). Beyond the retail sector, the value of residential property in and around Orchard Road remains robust. For example, in April 2018, the URA sold a residential site on nearby Cuscaden Road for almost S$2,400 per square foot, setting a new record for the price of GLS land.

The government's planning and design measures at Orchard Road have yielded many positive outcomes for businesses and landowners. More importantly, these interventions have created tangible improvements to the public realm, most notably to the central promenade, and through the provision of extensive spaces for leisure and enjoyment, ensuring that Orchard Road remains appealing to visitors and Singaporeans alike.

PARK CONNECTOR NETWORK

Phase 1: Context

When the Park Connector Network (PCN) was being conceptualized, the intention was to achieve a matrix of green connectors weaving through urban spaces and linking up Singapore's parks, gardens, and nature reserves, thereby increasing residents' accessibility to nature and greenery. This involved the curation of regional walking and cycling loops connecting major green spaces as well as interregional connections. Each cycling loop would adopt the character of the region and the parks that it connects, thereby offering users a varied recreational experience across Singapore.

The PCN would also serve as a network of green ecological pathways. Fast-growing, native trees and shrubs were intentionally planted to attract endemic biodiversity such as native birds and butterflies along the PCN. This would

encourage Singaporeans to appreciate nature at their doorstep, thus fostering the environmental stewardship that underlies NParks's "City in a Garden" vision.

Phase 2: Planning and Design

One of the key planning and development principles of the PCN was to optimize unused narrow, linear land strips by converting them into landscaped recreational corridors. These were typically spaces that had been set aside for future uses, such as widening of roads (road reserves) and drains (drainage reserves). Even unused land next to a park has been considered and redesigned as a cycling bridge in the PCN (photo 15.5).

The other key principle was to provide a dedicated, recreational experience that was easy to maintain, with sufficient track width and good thermal comfort provided by shade canopy trees. PCN tracks would either be in asphalt or concrete for hardiness and fuss-free maintenance. Other supporting infrastructure, such as lighting, toilets, shelters, dedicated bicycle crossings, and wayfinding signage were also necessary for the safety and convenience of PCN users as well as to build up the PCN identity (photo 15.6).

In terms of spatial needs, studies ascertained that a 4-meter-wide track was sufficient, and this gave rise to two main typologies for the entire PCN:

- *Along roads:* Under this typology, the 6-meter roadside PCN comprises a split track of 4 meters in width (2.5 meters for cycling and 1.5 meters for footpath) and a 2-meter-wide planting strip on one side of the track (figure 15.4, panel a).

- *Along waterways:* When the PCN runs alongside a waterway, the land take will be 6 meters wide, measured from the edge of the outer drain wall. These 6 meters will comprise a split track of 4 meters in width (2.5 meters for cycling and 1.5 meters for footpath) and a 2-meter-wide planting strip next to the canal (figure 15.4, panel b). The latter will soften the canal edge and provide the option of a meandering track to break the monotony of long stretches of the drains. The availability of space provides the flexibility to design the planting verge on either side of the track.

The PCN can also use or visually "borrow" greenery from adjoining developments to enhance the recreational experience and better create a sense of spaciousness. For example, such borrowed greenery is found in park connectors adjoining porous public housing developments or waterfront developments (photo 15.7).

Phases 3 and 4: Implementation and Management

From Piloting to Long-Term Implementation

The PCN is an innovative idea for a small, land-constrained island state like Singapore. It creates an islandwide green recreational network that is easily accessible for a majority of residents. After rounds of interagency discussions, the Garden City Action Committee (GCAC) officially endorsed the PCN initiative on December 4, 1991. The Kallang Park Connector, which links Bishan-Ang Mo Kio Park to Kallang Riverside Park, was implemented as a pilot project. Mr. S. Dhanabalan, then Minister for National Development, opened the first completed park connector along Kallang

a. Before: Unused land near a park   **b. After: Cycling bridge**

PHOTO 15.5 **Urban Voids Redesigned as Dedicated and Recreational Public Spaces in the PCN, Singapore**

Source: ©National Parks Board (NParks). Reproduced, with permission, from NParks; further permission required for reuse.
Note: PCN = Park Connector Network.

a. Before: Unused drainage reserve   **b. After: Attractive cycling path**

PHOTO 15.6 **Re-Created Pedestrian Networks in the PCN, Singapore**

Source: ©National Parks Board (NParks). Reproduced, with permission, from NParks; further permission required for reuse.
Note: PCN = Park Connector Network.

River in August 1992. This was followed in quick succession by the Ulu Pandan Park Connector, which was completed in December 1994.

The popularity of these pilot PCNs gave rise to the first PCN program, which was approved in 1994 to implement 36 kilometers of park connectors (14 stretches) between 1995 and 1999—kick-starting an almost three-decades-long effort. This marked an important milestone in the journey of the PCN as the implementation of park-to-park recreational green links became a mainstay in the master planning of the city.

First-generation park connectors were basic tree-lined trails, simply furnished with benches and bins. In terms of implementation, the biggest challenge was (and still is) finding enough space in a heavily built-up environment with competing development needs. With pavements, covered linkways, drains, utility service pipes, and roadside greenery squeezed into the narrow spaces beside roads, it is often difficult to imagine where the additional 6 meters of
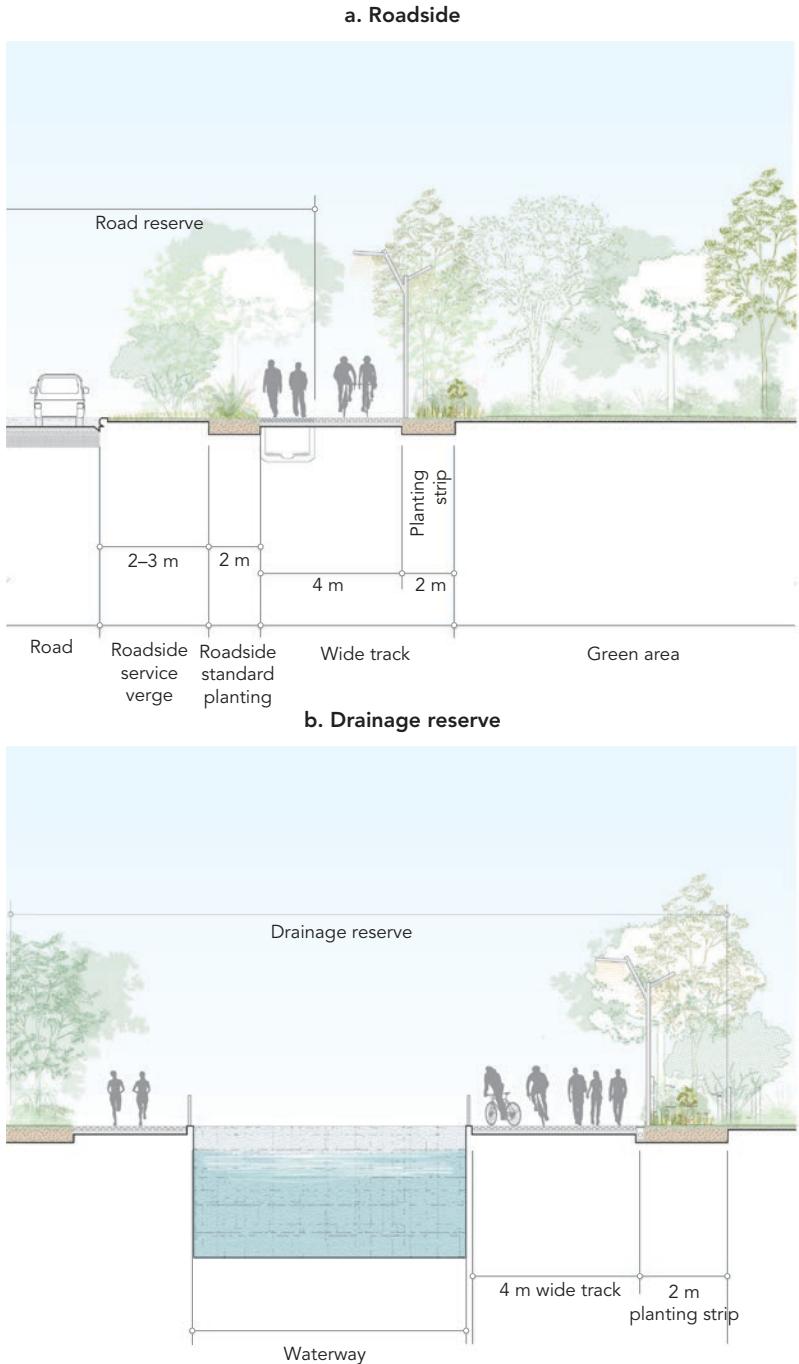
a. Roadside

b. Drainage reserve

FIGURE 15.4 **Typical Spatial Design Typologies for the PCN, Singapore**

Source: ©World Bank, based on National Parks Board (NParks). Further permission required for reuse.
Note: PCN = Park Connector Network; m = meters.

PHOTO 15.7 **"Borrowing" of Greenery from PCN-Adjacent Bedok Neighborhood, Singapore**

Source: ©National Parks Board (NParks). Reproduced, with permission, from NParks; further permission required for reuse.
Note: PCN = Park Connector Network.

width for the park connector would come from. Close cooperation with other government agencies and private landowners was necessary to ensure that the right spaces were safeguarded in the larger interest of public recreation. In this respect, having design considerations and clear typologies ready up front were useful during stakeholder discussions and negotiations. Where connections were not ideal, management solutions were implemented, such as barriers to slow down cyclists or signs asking them to dismount and push their bikes.

Transforming Lifestyles with the PCN Experience

To date, Singapore has achieved an islandwide network comprising seven regional loops of 20–40 kilometers each, linking not only parks but also transport nodes and residential, commercial, and even industrial districts. Office workers can now enjoy a refreshing commute to work through a green corridor while getting their daily dose of exercise. The Western Adventure loop was completed in 2009, followed by the Northern Explorer Loop and the North-Eastern Riverine Loop in quick succession in 2010 and 2011, respectively.

To date, 320 kilometers of park connectors have been completed, and Singapore aims to achieve 400 kilometers by 2030. In addition, the LTA has started implementing intratown and intertown cycling paths to complement

NParks's PCN, enhancing connectivity across the island. This seamless and integrated cycling network has brought immense benefit to the community and brings Singapore one step closer to being a car-light city.

Round Island Route: The Green Cycling Highway

Together with the growth of the PCN, cycling as a form of recreation or commuting has gained mainstream popularity among Singaporeans. There was a need to facilitate a smooth cycling experience for longer rides. This gave rise to the Round Island Route (RIR). Conceptualized by the URA and NParks, the RIR is planned to be a 150-kilometer continuous green cycling highway looping around mainland Singapore (map 15.2). It intended to offer a unique experience by bringing users through diverse natural and urban landscapes, including nature reserves, beaches, wetlands, farmland, residential heartlands, business parks, and downtown districts.

Phase 5: Impact Evaluation

As more park connectors were built to meet the needs of the growing population, it was necessary to understand the PCN's impact on the community at large. Research has shown that contact with green spaces has been associated with benefits to mental health, particularly reduced levels of stress (Van den Berg et al. 2010), and that physical activity in green spaces improved mood
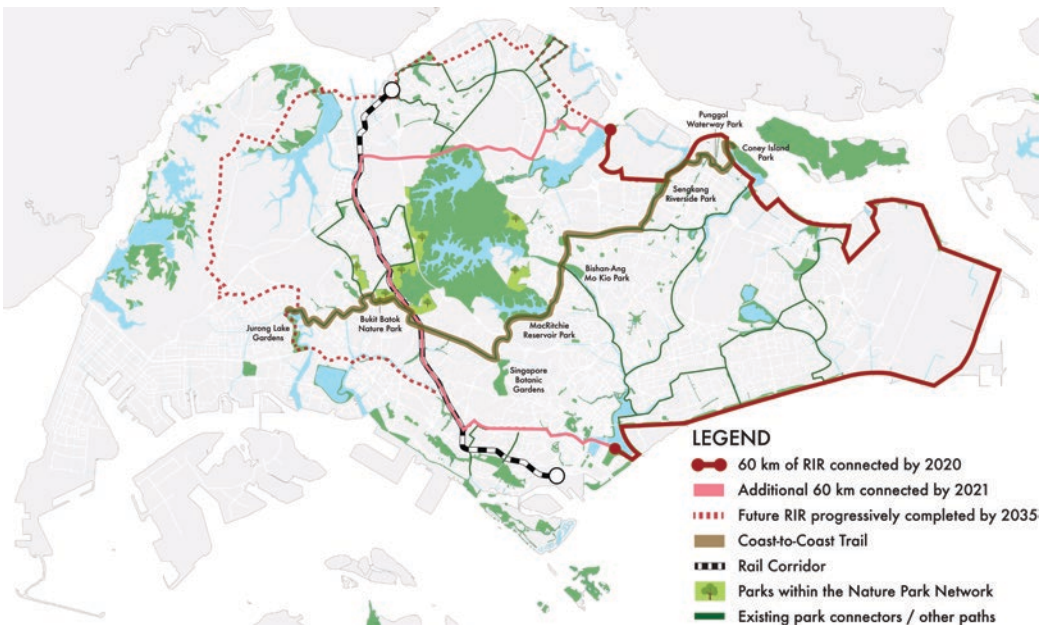
MAP 15.2 **Map of Recreational Connections, Singapore**

Source: ©National Parks Board (NParks). Reproduced, with permission, from NParks; further permission required for reuse.
Note: PCN = Park Connector Network.

and a sense of "belonging" within a work community, which in turn translates to increased workplace productivity (Barton and Pretty 2010).

NParks's Park Usage and Satisfaction Survey 2016 found that 88 percent of respondents visited parks and park connectors at least once in the preceding 12 months (NParks 2016). This was an increase of 16 percent from the previous survey conducted in 2014. In the same 2016 survey, 50 percent of respondents felt that park connectors were getting busier. This implied that with the steady expansion of the network, the use of parks and the PCN had significantly increased.

The survey findings also helped NParks to better understand PCN utilization patterns and was useful in refining the planning process for future park connectors to continue to enhance the PCN experience. NParks is also exploring "family-friendly PCN loops" of around 5–10 kilometers that are easy for both young and old to complete in approximately an hour. Such loops will promote the use of nature-based recreation for a healthy lifestyle, family bonding, and outdoor learning. Singapore also aims to offer refreshing experiences on the PCN such as the Coast-to-Coast Trail, which brings people to different scenic and interesting places across the island.

From providing simple green links between parks to recreational commuting infused with native flora and fauna, NParks's PCN journey continues to evolve. The larger intention is to connect Singaporeans from different walks of life, foster cohesion, and build social resilience through a network of pervasive greenery, with the PCN as its backbone. NParks envisions the PCN as offering a new dimension of recreational opportunities in close proximity to residential areas that are themselves venues for lifestyle, social, and community activities. NParks continues to innovate and provide new experiences for the public in shaping Singapore into a biophilic "City in a Garden"—a green oasis comprising an interconnected network of verdant streetscapes, gardens, parks, nature reserves, and vertical greenery.

HAWKER CENTERS

Phase 1: Context

Access to local food features greatly in Singaporean culture and everyday life. Food markets—more commonly referred to as hawker centers in Singapore—are purpose-built, naturally ventilated complexes of stalls that sell cooked food at affordable prices. With strict regulation and upgrading over time, these food nodes have evolved to become clean, accessible social spaces frequented by people from all walks of life. Hawker centers were originally built to resettle and organize street vendors and hawkers so as to better manage public health and sanitation issues associated with hawking food on the streets. They have since become a mainstay in the urban landscape, offering a variety of cooked fare at affordable prices islandwide while preserving Singapore's unique food heritage. Over time, hawker centers have become integral to Singapore's way of life and serve as "community dining rooms" where Singaporeans from different races, religions, and diverse backgrounds come together to share meals.

A hawker center was a solution to manage the streets of Singapore, which were once rife with itinerant hawkers and street peddlers. Hawking was an important means of livelihood for many, especially immigrants, because it required little capital and could generate a good income. In the 1930s, some 6,000 licensed itinerant hawkers and 4,000 unlicensed hawkers were estimated to have roamed the streets, selling affordable cooked food and local produce (Thulaja 2016). By 1966, the number had grown to 40,000 licensed and unlicensed hawkers (Tan, Jean, and Tan 2009).

The government could not, however, ignore the urban problems that arose as the number of street hawkers increased. The Hawkers Inquiry Commission Report recommended that hawkers be removed from the streets because the activities of hawkers conflicted with the goals of development, for they were competing directly with the modern sector for land usage. In addition, hawkers usually did not have a proper water supply and posed risks to public health (Hawkers Inquiry Commission 1950).

After independence, the government stepped up to address these urban challenges. From the 1960s to 1980s, hawkers islandwide were registered, licensed, and relocated from main streets to side lanes and eventually to purpose-built hawker centers. Enforcement against illegal hawking was tightened.

Authorities also had to be cognizant of the benefits and services offered by the street hawkers. In 1970, Health Minister Chua Sian Chin said the government recognized that hawkers served a need in society. Hawkers kept food prices low, moderating the cost of living for ordinary people, and created jobs (*Singapore Herald* 1970). The government was thus reluctant to remove hawkers completely (Lim 2013).

In 1970, an ambitious five-year plan was announced to clear all hawkers off the streets into purpose-built "hawker centers" (*Straits Times* 1970). To encourage resettlement, hawkers would be given an indoor stall at a subsidized rental. The earlier licensing exercise was useful in identifying bona fide hawkers to be relocated into permanent facilities (Tan, Jean, and Tan 2009). Hawker centers were built into new townships, as part of each town's commercial center. According to guidelines, a hawker center was to be built for every 4,000–6,000 households. This ensured that hawkers would be located near a ready client base, ensuring greater likelihood of business sustainability.

Since then, hawker centers have emerged as crucial social spaces in the Singaporean urban landscape by ensuring access to affordable, diverse food options alongside the inclusiveness of access to these affordable cooked food options—making them a food paradise for all, a celebration of Singapore's multicultural identity, and a unique social leveler. By 2018, there were 114 wet markets (selling produce) and hawker centers managed by the National Environment Agency (NEA), with plans to build 13 more hawker centers (map 15.3).

The following sections will share how the program was implemented through policy, monitoring, and enforcement; cover the design of hawker centers to adhere to their social objective as a public space; and describe the considerable positive impacts hawker centers have had on Singapore residents.

MAP 15.3 **Locations of 114 Hawker Centers in Singapore, July 2018**

Source: Centre for Liveable Cities (CLC) with data and base layer from National Environment Agency (NEA) and Singapore Land Authority (SLA), respectively. ©CLC. Reproduced, with permission, from CLC; further permission required for reuse.

Phase 2: Planning and Design

The 1971 Concept Plan advocated shifting the population away from the city center, leading to plans that were drawn up to design and build self-contained housing estates, each with its own commercial, institutional, and recreational facilities. Each new estate, depending on population size, typically had a town center and a few neighborhood centers featuring many shop units and a hawker center, often with an adjoining wet market to serve the residents in the town.

Hawker centers are designed to be inclusive spaces for all and reflect the ethnic and cultural makeup of Singapore through their diverse food options. They serve flavors from the Malay, Indian, and Chinese ethnic groups as well as cuisines from other ethnicities. With Singaporeans spending an average of 37 percent of their food budgets on hawker fare, these hawker centers have become convenient primary sources of food (Tan 2015). This is particularly significant for lower-income groups, underlining the need to keep hawker food prices affordable. Recently built hawker centers, such as in Our Tampines Hub and Kampung Admiralty, are also co-located with community centers, recreation facilities, and government service offices for residents' ease. The co-location also allows for maximizing uses of limited land.

The planning and design of hawker centers involve several considerations, as discussed below.

Access and Layout

Early hawker centers were located in town centers and neighborhood centers within housing estates, close to residents' homes in order to meet their shopping and dining needs. Today, new hawker centers may be built

in neighborhood centers, but they are planned to be accessible from multiple sides to connect with various transport nodes, community facilities, and housing areas (BCA 2016). Where feasible, pedestrian links to key amenities are also built in. For example, Pasir Ris Central Hawker Centre has pedestrian links to adjacent buildings, ramp connections to surrounding parkland and facilities, and bicycle path connections (Kung 2018).

Where possible, hawker centers are located on ground floors; otherwise, escalators and lifts are provided to allow easy access. They are generally designed to be on a single level without steps or split levels. Where necessary, a gradual ramp or slope of a suitable gradient is permitted to mitigate differences. Floor finishes are firm, slip-resistant, and durable (BCA 2016).

Food and service counters, seating areas, and toilets are designed for patrons to maneuver easily. Hawker centers were thus planned with a clear and ergonomic layout and with unobstructed access routes to facilitate easy and independent access throughout (BCA 2016). Some common layouts that can be found in hawker centers include the central layout, grid layout, linear or axial layout, and free-form layout (figure 15.5).
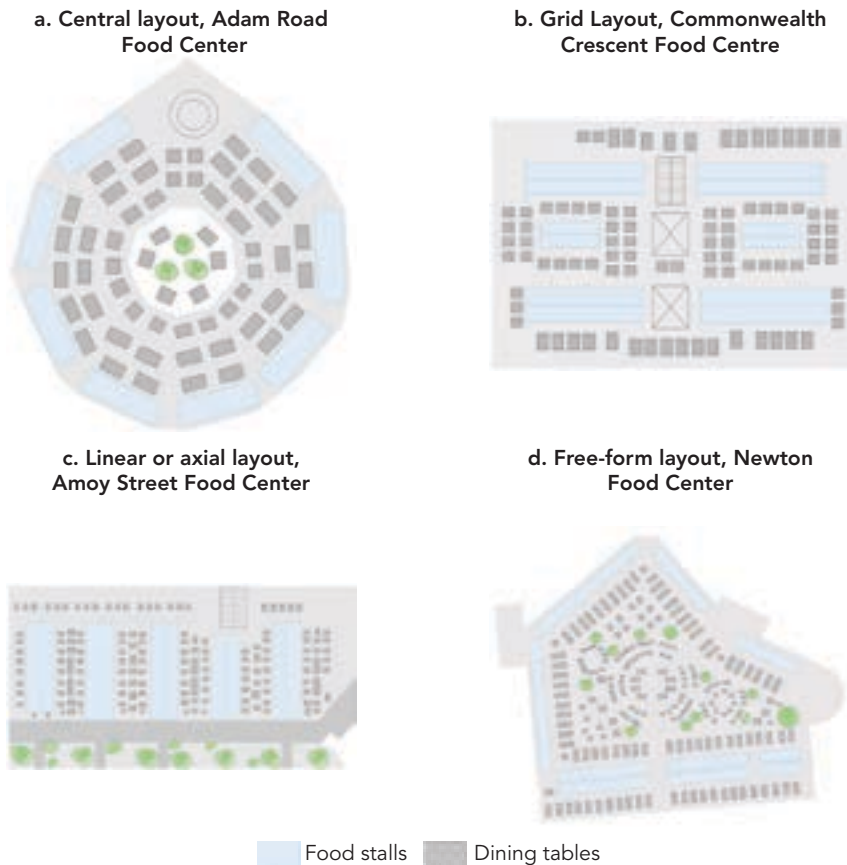
a. Central layout, Adam Road Food Center

b. Grid Layout, Commonwealth Crescent Food Centre

c. Linear or axial layout, Amoy Street Food Center

d. Free-form layout, Newton Food Center

Food stalls   Dining tables

FIGURE 15.5 **Site-Specific Layouts and Universal Designs for All: External Structures and Internal Flow of Hawker Centers, Singapore**

Source: ©Centre for Liveable Cities (CLC), with information from the National Environment Agency (NEA). Reproduced, with permission, from CLC; further permission required for reuse.

Ventilation

Good ventilation and comfortable microclimate are important considering Singapore's hot and humid conditions. Designers learned from experience in implementing and upgrading the existing hawker centers. Greater air movement is facilitated through exhaust flue systems in cooked-food stalls and fans sited in the refreshment area. The exhaust flue system extracts hot air from stalls and discharges it outside the hawker center, reducing heat buildup within the center while the fans enhance the natural ventilation.

More recently, computer simulations have been used for designing new hawker centers to improve ventilation. Fans are controlled by a central timer that operates only during opening hours to conserve energy. For example, Pasir Ris Central Hawker Centre uses a combination of (a) a customized metal façade panel High-Volume Low-Speed (HVLS) with openings and aerofoil louvers, and (b) double-volume high ceilings to maximize airflow. In recent years, HVLS fans have been added to further improve airflow circulation efficiency (Kung 2018).

Tables and Seats

Because hawker centers are social nodes, design guidelines also include varied, flexible arrangements of tables and seats for patrons with different needs and abilities, like families with young children, the elderly, and wheelchair users (BCA 2016). For fixed seating, at least 1 of every 10 tables (or part thereof) is provided for use by persons with disabilities, or at least 2 tables, whichever is greater. At least 5 percent of overall seating should be family-friendly, which may consist of a table or seat mix of regular and child-friendly heights.

Over time, many of these design elements were also updated to continuously ensure that hawker centers are inclusive spaces for all. For example, many new hawker centers feature Braille and tactile information on staircase handrails to guide the visually impaired. Family-friendly features—like a family room with nursing and diaper-changing facilities, and parking spaces for wheelchairs and prams—are also common sights. To date, four new hawker centers have been awarded the BCA's Universal Design Awards since 2016 (NEA 2017; photo 15.8).

a. Bukit Panjang Hawker Centre   **b. Yishun Park Hawker Centre**

PHOTO 15.8 **Award-Winning Hawker Center Designs within Walking Distance from Residential Communities, Singapore**

Source: ©Ken Lee. Reproduced, with permission, from Ken Lee; further permission required for reuse.

Phase 3: Implementation

In 1971, the government approved a sum of S$15 million for the building of markets and hawker centers (Loh and Wong 1987). The HDB was directed to construct hawker centers with the dual objectives of resettling street hawkers as well as to provide amenities for the new towns. In 1976, a further S$21.4 million was approved for the construction of markets and hawker centers (Loh and Wong 1987). The last of these hawker centers was built in 1985, resettling the remaining licensed hawkers.

Each hawker center comprised a market section and a cooked food section. The centers were provided with essential amenities such as proper sewage connections, piped water and electricity, and bulk bin centers for the disposal of refuse. The cooked food stalls were also compartmentalized and lined with glazed tiles. Fixed tables and stools for customers became a common feature in all hawker centers. Ceiling fans and toilet facilities were also available for the comfort and convenience of the patrons (Tan, Jean, and Tan 2009).

Beyond the residential estates, the Jurong Town Corporation (JTC) was tasked with developing industrial estates, and hawker centers were also built there. Some of the street hawkers were resettled into hawker centers built within the industrial estates.

By the late 1990s, many of the hawker centers were at least 20 years old and in poor physical condition. Because these centers provided essential amenities to residents, they had to be upgraded to match the rejuvenation that was taking place in the housing estates where they were located. The Hawker Centres Upgrading Programme (HUP) was launched in 2001 at a cost of S$420 million. The program, which spanned more than 10 years, improved the conditions and facilities of all hawker centers in Singapore (Leong 2001).

In 2011, after a hiatus of 26 years, the government responded to the public's requests for more hawker centers and announced the building of 10 new ones, focusing on the Housing and Development Board (HDB) towns facing an underprovision of eating options. A further 10 were announced in 2015. In all, 20 new hawker centers will be built by 2027, of which 7 have been completed. To better optimize land and public assets, and to better manage them by providing multiple uses and community services, some of the new hawker centers are also co-located with other public facilities such as community centers, police posts, polyclinics, and sports facilities.

Centrally locating hawker centers in townships and urban spaces was also crucial to the success of resettlement. It ensured that displaced hawkers could continue their businesses with a ready supply of customers from neighboring housing and provided central "marketplaces" that serve as landmarks and meeting spaces today.

Phase 4: Management

After the construction of hawker centers, a set of regulations was put into place to uphold basic sanitation levels. An Environmental Public Health Act was introduced in January 1969 to incorporate public health practices into

the licensing and control of hawkers and food establishments. In the 1970s, 140 hawker inspectors from the Ministry of the Environment carried out spot checks for sanitation; hawkers had a six-month grace period to get used to new health regulations (*New Nation* 1973). Under the law, all stallholders selling food and hawker centers were required to prominently display food prices. Surprise checks to ensure that hawkers displayed food prices on their signboards were also common. Offenders were liable to a maximum fine of S$150 in the first instance and to a further fine of up to S$50 for each day the offense continued after conviction (*New Nation* 1977).

Despite legislation and strict enforcement, many hawkers continued with unhygienic practices, raising concerns about public health and the sanitation of cooked food (*Straits Times* 1985). Thus, in the 1970s and 1980s, the Ministry of the Environment organized a series of public health campaigns to promote good food hygiene practices (Lim 2013). This doubled as a soft tool to encourage better practices among hawkers while also educating the public, because legislation and strict enforcement alone had not been effective in getting the hawkers to adopt better food handling practices. In 1987, a Points Demerits System was introduced as a systematic method of imposing penalties on hawkers who did not meet public health standards. Potential or new hawkers were also required to obtain a Food Hygiene Certification before they could register (Lim 2013). This was later revamped, and currently the Singapore Food Agency requires hawkers to complete the Basic Food Hygiene Course conducted by the Workforce Development Agency's accredited training providers.

In 1998, a grading system was put in place to complement the Points Demerit System. The grading system used a simplified method to indicate the cleanliness of each stall. Every food stall must be graded once a year, and stalls are required to display these grades (Lim 2013). This system incentivizes hawkers to improve cleanliness levels because it makes the public aware of the cleanliness levels of each stall. Singapore's Health Promotion Board also introduced the Healthier Dining Programme to encourage consumers to choose whole grain, "Low GI (low glycemic index)," and lower-calorie meal options (Gan 2017). It is hoped that 4 in 10 hawker stalls will have at least one healthier dish by mid-2019.

In 2003, authorities consolidated the hawker center development, management, and policy functions under the NEA. With this consolidation, the HDB transferred the management functions of the HDB hawker centers to the NEA on April 1, 2004. The ownership of the HDB hawker centers and markets continues to reside with the HDB.

Phase 5: Impact Evaluation

Public Health

Even as hawkers had access to potable water and other amenities, food cleanliness and safety at the stalls were challenges. As noted earlier, a Points Demerit System was introduced in 1987 to penalize hawkers who violated public health laws. Repeat offenders were liable to have their licenses suspended or revoked (NLB 2010). However, this did not help the public to make well-informed choices. Its replacement in 1997 with a grading system

specifically helped to (a) ensure that the public could discern stall hygiene, and (b) encourage stalls to raise their hygiene standards. Stalls were scored based on overall hygiene, cleanliness, and housekeeping standards to receive a grade. Grade A indicated a score of 85 percent or higher, and grade D, the lowest, indicated a score of below 40 (NLB 2010). Grades were reviewed annually by NEA inspectors. All stalls had to display the grades prominently. This program was largely successful: in 2006, 77 percent of licensees were graded either A or B; this rose to 99 percent by December 31, 2018.[2]

With almost all licensees being graded A or B, the grading system has, however, become less useful in helping consumers to distinguish good performers. In June 2018, the NEA introduced a new Food Hygiene Recognition Scheme for licensed food retail establishments. This scheme recognizes retail food establishments that have consistently upheld high hygiene standards over the years.

Furthermore, since June 2012, the latest grades, suspension records, and accumulated demerit points of licensed food premises have been published on the NEA website. This allows patrons to make informed choices and has spurred operators and food handlers to maintain good hygiene practices throughout the year.

Food Affordability

Hawker centers and wet markets were built by the government between the 1960s and 1980s with the main objective of resettling hawkers from the streets. They also provided eating and marketing amenities for residents in new towns.

The role of hawker centers has evolved over the years into an important social one. A key aim of hawker centers is to provide affordable food for all. This has been largely successful, and hawker centers remain an important source of reasonably priced food. Food remains a significant portion of household expenditure, constituting an average of 20 percent of household expenditure (DOS 2014). One in three Singaporean residents eat out more than they eat at home. When eating out, 81 percent say hawker food is their meal of choice (Weber Shandwick 2015).

The NEA's existing tender policies help to moderate rentals of stalls, ensuring that food prices are kept low. Prices are also kept affordable by building new centers to increase the supply of hawker stalls, ensuring that stalls are personally operated (without the practice of subletting), and abolishing the concept of reserve rent. The removal of reserve rent allows bidders to take up stalls at rental rates below the assessed market rent, thus keeping stall rentals down (Balakrishnan 2015).

To further assist hawkers to keep their costs low, NEA launched a Productive Hawker Centres program in 2017 to help hawkers improve their productivity. Under the program, the NEA cofunds the operating costs of stallholders when the centers adopt productivity formats such as centralized dishwashing and automated tray return systems. The NEA also launched a Hawkers' Productivity Grant whereby the government cofunds the hawkers' purchase of kitchen automation equipment. These initiatives aim to help hawkers cope with manpower constraints, manage costs, and keep food prices low for consumers.

Cultural Value

Hawker centers are integral to the Singaporean way of life. Today, 114 hawker centers serve as "community dining rooms" where people from diverse backgrounds gather and share the experience of dining over breakfast, lunch, and dinner (photo 15.9). Hawker centers are placed not only in residential townships but also in popular recreational areas to provide affordable food options.

In August 2018, Singapore announced its plans to nominate Singapore's hawker culture for inscription onto the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Representative List of the Intangible Cultural Heritage of Humanity. Singapore's hawker culture—constituting the hawker centers, the wide variety of food they offer, and their role as vibrant community spaces—is an important part of the country's intangible cultural heritage. The selection of hawker culture was made after a series of public engagement efforts involving Singaporeans from all walks of life. Across the sessions, hawker culture was consistently highlighted as an intangible cultural heritage that best represents Singapore's multicultural heritage, with hawker centers viewed as important community spaces. The findings from the focus group discussions were similar to other studies conducted in the past. For instance, a survey conducted by the NEA in 2016 found that close to 85 percent of respondents felt that hawker centers played an important role

PHOTO 15.9 **Diners at Maxwell Food Centre, Singapore**

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in community bonding. The same survey revealed that 90 percent of respondents strongly agreed that hawker centers are an integral part of Singapore's identity. More importantly, hawkers and their repertoire of skills are central in keeping hawker culture sustainable.

Through this and other efforts, it is hoped that there will be an increased awareness, recognition, and appreciation of hawker culture as well as encouragement of the active transmission of hawker trade from one generation to the next. These efforts will ensure that hawker centers continue to be vital public spaces for Singaporeans for generations to come.

NOTES

1. The Singapore government launched the Government Land Sales (GLS) program in 1967 to sell state-owned land parcels to private developers for residential, commercial, industrial, and other developments. GLS sites are sold through an open tender process, to the highest bidder. The government prescribes what each site can be developed for and the allowable development intensity (both parameters being reflected in the Master Plan); often, specific planning and urban design guidelines are stated up front in the conditions of tender. Thanks to the clarity, fairness, and transparency of the tender process, the GLS program has emerged as one of the most successful examples of a public-private partnership in Singapore that safeguards the interests of both the government and businesses in the realization of urban infrastructure projects.

2. Each food establishment will be graded annually based on its food hygiene and food safety standards before its license expires. The Food Establishment Inspection Checklist for the list of criteria to assess the grading of hawkers consists of 13 key areas, including premises, storage, food processing equipment, food handling and staff facilities, product identification, and dispatch and transport. Food establishments cannot be awarded grade A if major nonconformities are found (SFA 2012).

REFERENCES

Abraham, Alex. 2003. *Awestruck on Orchard Road: A Collection of Short Stories*. Aminjikarai, Chennai: EastWest Books.

Anderson, Colin, Fumihiko Maki, Kenneth Frampton, Debbie Ball, and D. P. Architects. 2012. *Evolution of a Retail Streetscape: DP Architects on Orchard Road*. Singapore: Images Publishing Group.

Balakrishnan, Vivian. 2015. "Rental Costs a 'Small Fraction' of Running a Hawker Stall: Vivian Balakrishnan." Channel NewsAsia, July 27.

Barton, Jo, and Jules Pretty. 2010. "What Is the Best Dose of Nature and Green Exercise for Improving Mental Health? A Multi-Study Analysis." *Environmental Science & Technology* 44 (10): 3947–55. doi:10.1021/es903183r.

BCA (Building and Construction Authority). 2016. *Universal Design Guide for Public Places*. Singapore: BCA.

Cheah, Gilbert. 2003. *Remaking of Orchard Road: Street of Singapore*. Singapore: Singapore Tourism Board.

CLC and SI (Centre for Liveable Cities and The Seoul Institute). 2016. *Walkable and Bikeable Cities: Lessons from Seoul and Singapore*. Singapore: CLC.

———. 2017. *Urban Systems Studies: Working with Markets: Harnessing Market Forces and Private Sector for Development*. Urban Systems Studies Series. Singapore: Centre for Liveable Cities.

CLC (Centre for Liveable Cities). 2015. *Urban Systems Studies: Planning for Tourism: Creating a Vibrant Singapore*. Urban Systems Studies Series. Singapore: CLC.

DOS (Department of Statistics Singapore). 2014. "Report on the Household Expenditure Survey 2012/13." Statistical report, DOS, Ministry of Trade and Industry, Republic of Singapore.

Gan, Kim Yong. 2017. "Measures to Restrict Distribution of Food and Beverage Products with High Glycemic Index." Response by Gan Kim Yong, Minister of Health, October 2. Parliamentary Debates Singapore: Official Report Contents 94 (51): 19–20.

Hawkers Inquiry Commission. 1950. *Report of the Hawkers Inquiry Commission, 1950*. Colony of Singapore: Government Printing Office.

Hee, Limin. 2017. *Constructing Singapore Public Space*. Singapore: Springer Singapore.

Keung, John. 2018. "No More Barriers: Promoting Universal Design in Singapore." Urban Solutions (Issue 6, Active Mobility): 36–41.

Koh, Michael. 2018. "Reimagining Orchard Road: Putting People on the Street." *Urban Solutions* (Issue 12, Inclusive Urban Regeneration): 44–53.

Kung, Jane. 2018. "Dining in a Park in a… Hawker Centre?" News and Insights, CPG Corp., April. https://www.cpgcorp.com.sg/news-insights/dining-in-a-park-in-a-hawker-centre.

Leong, Phei Phei. 2001. "All Hawker Centres to Be Upgraded." *Today*, February 19.

Lim, Tin Seng. 2013. "Hawkers: From Public Nuisance to National Icons." *BiblioAsia* 9 (3): 10–17.

Loh, A. T., and K. M. Wong. 1987. "Long Term Policy on Markets and Food Centres." Ministry of the Environment and Water Resources, Singapore.

Meng, Xianming, Mahinda Siriwardana, and Tien Pham. 2013. "A CGE Assessment of Singapore's Tourism Policies." *Tourism Management* 34: 25–36.

MND and MEWR (Ministry of National Development and Ministry of the Environment and Water Resources). 2015. *Our Home, Our Environment, Our Future: Sustainable Singapore Blueprint 2015*. Singapore: MND and MEWR.

MTI (Ministry of Trade and Industry). 2017. "Speech by Minister S. Iswaran at the Tourism Industry Conference 2017." Singapore Tourism Board, April 13.

NAS (National Archives of Singapore). 2004. "Speech by Dr. Vivian Balakrishnan, Acting Minister for Community Development, Youth and Sports and Senior Minister of State for Trade and Industry." The Association of Shopping Centres (TASC) Shopping Centre Conference on "Managing Shopping Centres," Raffles City Convention Centre, Singapore, November 24.

NEA (National Environment Agency). 2017. "Together for a Sustainable Future: Annual & Sustainability Report 2016/2017." NEA, Singapore.

New Nation. 1973. "Cleanliness Lesson for Hawkers." *New Nation*, September 13.

———. 1977. "Checks on Price Tags." *New Nation*, July 23.

NLB (National Library Board). 2010. "Hawker Centres." Singapore Infopedia, National Library Board, Singapore.

NParks (National Parks Board). 2016. "Park Usage and Satisfaction Survey." Internal report, NParks, Singapore.

———. 2017. "Discovering Greenery in the Sky." *MyGreenSpace* 1 (32). Quarterly newsletter, National Parks Board (NParks), Singapore.

SFA (Singapore Food Agency). 2012. "Food Establishment Inspection Checklist." Regulatory document, SFA, April 1 (accessed April 30, 2019).

Singapore Herald. 1970. "All Hawkers Off Streets – in This Govt Plan." *Singapore Herald*, August 5.

Sng, Lydia. 2015. *The Evolution of Singapore Real Estate: Journey to the Past and Future: 1940–2015*. Singapore: Knight Frank Pte Ltd.

STB (Singapore Tourism Board). 2005. "Singapore Sets Out to Triple Tourism Receipts to S$30 billion by 2015." Press release, January 11.

———. 2014. "Annual Report 2013/14." Singapore Tourism Board.

———. 2016. "Annual Report on Tourism Statistics." Statistical report, Singapore Tourism Board.

———. 2017. "Design Orchard to Cultivate Singapore Designers." Press release, October 30.

STPB (Singapore Tourist Promotion Board). 1997. "Tourism 21—Vision of a Tourism Capital." Planning document, STPB, Singapore.

Straits Times. 1966. "The 'Small' Man Who Has Become a Big Problem." *The Straits Times*, January 20.

———. 1970. "Hawkers Off the Street by 1975." *The Straits Times*, August 5.

———. 1985. "Hawker Centres or Shocker Centres?" *The Straits Times*, October 6.

Tan, Shin Bin. 2015. "Keeping Char Kway Teow Cheap—At What Price?" Case study, Lee Kuan Yew School of Public Policy, National University of Singapore.

Tan, Yong Soon, Lee Tung Jean, and Karen Tan. 2009. *Clean, Green and Blue: Singapore's Journey towards Environmental and Water Sustainability*. Singapore: Institute of Southeast Asian Studies.

Thulaja, Naidu Ratnala. 2016. "Travelling Hawkers." National Library Board Singapore Infopedia (accessed January 8, 2019), http://eresources.nlb.gov.sg/infopedia/articles/SIP_47_2004-12-27.html.

Tung, Ai Jui. 2016. "Hawker Centres." National Library Board Singapore Infopedia (accessed June 11, 2019), http://eresources.nlb.gov.sg/infopedia/articles/SIP_1637_2010-01-31.html?s=Hawker%20Centres.

URA (Urban Redevelopment Authority). 2001. "Making Orchard Road More Happening!" *Skyline* (March–April): 6–10.

———. 2005a. "Art Incentive Scheme for New Developments in Central Area." Circular to Professional Institutes, Circular No. URA/PB/2005/23-CUDD, Urban Redevelopment Authority, Singapore.

———. 2005b. "Sale of Site for Commercial Development on Land Parcel at Orchard Road /Paterson Road (Orchard Turn): Technical Conditions of Tender." Document, Urban Redevelopment Authority, Singapore.

———. 2005c. "Urban Design (UD) Plans and Guidelines for Orchard Planning Area: (A) Revision to Façade Articulation Guidelines (B) Guidelines for Party Wall Developments." Circular to Professional Institutes, Circular No. URA/PB/2005/07-CUDD, Urban Development Authority, Singapore.

———. 2007. "Revving Up Orchard Road." *Skyline* (November–December): 14–16.

———. 2013a. "Orchard Road Development Commission (ORDEC)." Circular to Professional Institutes, Circular No. URA/PB/2013/06-CUDG, Urban Development Authority, Singapore.

———. 2013b. "Urban Design (UD) Plans and Guidelines for Developments Within Orchard Planning Area." Circular to Professional Institutes, Circular URA/PB/2013/15-CUDG, Urban Redevelopment Authority, Singapore.

———. 2014. "Landscaping for Urban Spaces and High-Rises (LUSH) 2.0 Programme: Landscape Replacement Policy for Strategic Areas." Circular to Professional Institutes, Circular No. URA /PB/2014/12-CUDG, Urban Redevelopment Authority, Singapore.

———. 2019a. "Plans to Enhance Orchard Road as a Lifestyle Destination Unveiled." Press release, January 30, Urban Development Authority, Singapore.

———. 2019b. "Real Estate Information System." Retrieved from https://spring.ura.gov.sg/lad /ore/login/findOutMore.cfm.

Van den Berg, Agnes, Jolanda Maas, Robert A. Verheij, and Peter Groenewegen. 2010. "Green Space as a Buffer between Stressful Life Events and Health." *Social Science & Medicine* 70 (8): 1203–10.

Weber Shandwick. 2015. "Asia Pacific Food Forward Trends Report II." Weber Shandwick, Singapore.