

*Original Paper*

# Urban Environmental Design, Guidelines in Creating a Balanced Singapore: Lessons for the Urban Communities in Thailand

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Received: August 27, 2020 Accepted: September 15, 2020 Online Published: September 23, 2020

doi:10.22158/uspa.v3n4p1

URL: <http://dx.doi.org/10.22158/uspa.v3n4p1>

## **Abstract**

*Singapore has many limited resources. But at the same time can develop the country and preserve the environment of the city in a balanced and sustainable way. Therefore, the design of the city on this issue of Singapore is being taken to study the guidelines, as well as bringing the ideas to be presented to the urban communities that are experiencing environmental problems. Thailand has considered applying, and from the study found that Singapore's urban development is consistent with universal theory, sustainable development, Smart City, compact city and livable city. And when analyzing these theories together with Singapore's urban environment design, can summarize the guidelines into 4 main issues which are the Guidelines for balancing the city, the Guidelines for linking areas and activities within the city, the Guidelines for land using and urban planning, and the Guidelines for designing landscape elements that promote the good environment in the city. Moreover, building confidence by creating a sense of the country ownership together, as well as the state and the people participation in the development process is an important factor that makes Singapore a fast urban development among the "Good urban environment".*

## **Keywords**

*urban environment, balance, urban community*

## 1. Introduction

Thailand, over the past decades, after accelerating the development of the country according to the National Economic and Social Development Plan; rural community areas have been developed to become a fast-paced urban community without planning and covering areas all over the country, causing the expansion without direction (Piomruen, 2006-2007). Thailand has realized the importance of these problems. As can be seen from putting the environmental management in various national development plans such as, National Economic and Social Development Plan with a period of 4 years. From the 8th National Economic and Social Development Plan (1997-2001) to present (the 12th plan, 2017-2021). Policies and plans to promote and maintain the national environmental quality, etc. Although Thailand has both short and long term measures that focus on developing people and solving environmental problems, but these measures do not proceed concretely (Rujiwich et al., 2010). Lack of readiness in providing basic services for a living and basic services for managing waste, including the lack of effective control planning for land use which causes the environmental problems of the city such as, pollution problems, both air and water pollution, solid waste, and hazardous wastes caused by communities and industrial plants, the increase in the number of slums, transportation traffic problems, the country's disorganization, etc. These problems are increasing day by day. There are direct and indirect impacts on people's lives, especially people in the urban areas (Office of the National Economic and Social Development Council, 2002, p. 5).

In the other side of Asia, Singapore has proven to be capable of solving the problems of urbanization by engaging in serious town planning since its 43 years of independence. It has come a long way in making this achievement, when we take a look at Singapore's history and a glimpse of the past environment when it started the journey in 1819 (Shichun, Ni, & Xing Qi Ang, 2008).

By the survey of Economist Intelligence unit in 2014 found that the 22 major cities in Asia, Singapore is Asia's most green metropolis (Office of Natural Resources and Environmental Policy and Planning, 2017). Also, being selected by many organizations to be a livable city at various levels such as, in 2010 Gallup's Potential Net Migration Index has ranked Singapore the number 1 city in which foreigners want to live in Asia, according to immigrant index, ECA international, in 2011 EIU has ranked as the 4th most livable city in Asia, and Monocle has ranked Singapore the 15th, according to the livable city index, etc.

Therefore, Singapore which is considered to be the country with the most sustainable economic growth in ASEAN, while being a green city with a good environmental management, will be used as a model for the lessons about urban environmental success. Including, bringing out the concepts and theories that Singapore uses to create balance and sustainability for the city's environment. And the final step is presenting guidelines for applying to the urban communities in Thailand.

## 2. Objectives

- 1) To study the guidelines of Singapore's urban environmental design that creates a balance between urban development and maintenance or creating a good urban environment.
- 2) To bring out the concept of Singapore's urban environmental design and present it as model plans for the urban communities in Thailand.

## 3. Urban Environment.

“Environment” is everything that is around us, which is both living beings and lifeless, both concrete (touchable and visible) and abstract (untouchable and invisible), both natural environment and man-made (Woraphong, 2018, p. 163). Because of the environmental problems, both water and air pollution become more problematic, these are all caused by humans and occurs in urban areas. Especially, in the industrial areas which affects the living, both hygiene and quality of life. Therefore, Urban Environment definition is being determined and expanded by more definitions (Rojanakanan, 2009, p. 1). The Thai Green Building Institute and the Thai Green Building Foundation (2016) have classified 5 types of urban environment, which are 1) Waste Management 2) Water Management 3) Green Area, Public Open Space and Brown field site 4) Preservation and Production of cultural heritage and 5) Reduction of pollution and urban heat island effect.

## 4. Singapore's Environmental Development

Singapore has a strong national and environmental development goals. Just two years after the decolonization, being independent, Singapore has started the environmental operations and sustainable growth (Policy Brief, 2018). And has been continuously developing the environment. From the above environmental development schedule of Singapore found that the first step of development is to create a new environment. Then, to solve various environmental pollution problems, including the allocation of new cities, to make the city clean and beautiful. As in 1992, Singapore began to create a clear purpose development plan which is an environmental development together with economic development. Since then, the development has been focusing on “Sustainable Environment” Including continuity of operations and follow-up. As a result, Singapore is a city with economic sustainability and is a livable city as we see today.

## 5. Singapore's Urban Environmental Design

### 5.1 Waste Management

#### 5.1.1 Singapore's Waste Management in General

Singapore aims to move towards becoming a zero waste nation by reducing its consumption of materials, and reusing and recycling them, to give them a second lease of life. It keeps Singapore clean and healthy, conserves precious resources, and frees up land that would have otherwise been used for landfills (Ministry of the Environment and water Recourses, Ministry of National Development and A

division of Ministry of National Development, 2015). Moreover, an agreement was made with the industry to reduce the materials of packaging (Singapore Packaging Agreement), as voluntary joint venture with the companies to design waste reduction in production. Conducting a national recycle project. There are 54 percent of recycling goals by creating a Senakau landfill area that can be landfilled 15,350 tons per day (The Agriculture, Natural Resource and Environment Planning Office (ANEO), 2014).

#### 5.1.2 Urban Environmental Design That Is Related to Waste Disposal

1) Focus on the design of trash cans that can be clearly distinguished between general wastes and recycle wastes. Including, getting into the details about separating recycle wastes into different types, such as glasses, plastics and papers for an easy removal and reuse.

2) The design of the bins is blended with other street furniture, such as benches, plant pots.

3) There are garbage dump spots throughout the city. Convenient to use, the condition is clean, neat, beautiful, not destroying the scenery of the city.



**Figure 1. Characteristics of Trash in Singapore**



**Figure 2. Characteristics of Trash in Singapore**

## 5.2 Water Resource Management

### 5.2.1 Water Resource Management in General

With the small size of a country and there're limited resources of fresh water for consumption. Highlighted that the country has only 139 m<sup>3</sup> per capita of annual renewable water resources within its boundaries, which is far less than the average of Asia's 3,947.6 m<sup>3</sup> and the world's 8,209.9 m<sup>3</sup> (Lai Choo Malon-Lee, 2013, p. 3). Therefore, Singapore focuses on water management, including drainage areas. There is the Singapore's national water agency: PUB which is the agency that is in charge of water management Under the vision of "Water for All: Conserve, Value and Enjoy" (SriCharoen, 2009, p. 80). There are 4 main water resources used in production.

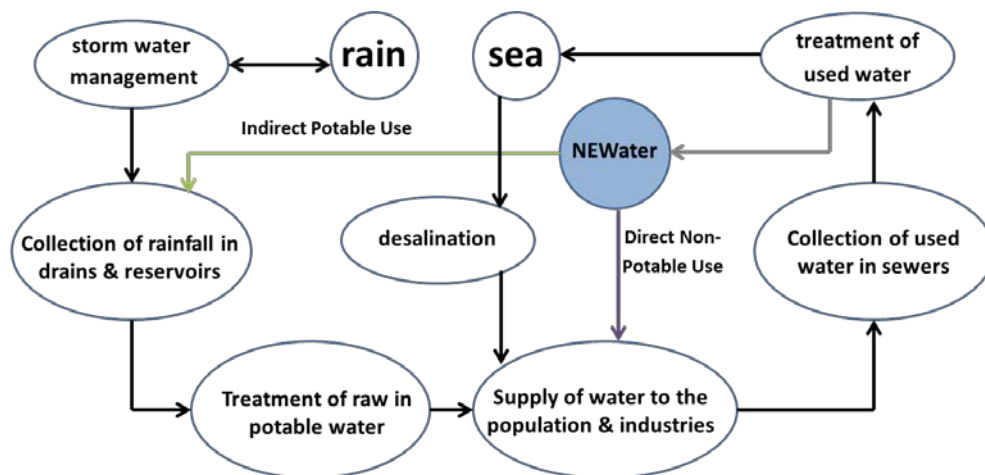
1) Local Catchment Water, such as reservoirs, rivers and canals to store water for water supply.

2) Imported Water, Importing water from the state of Johor, Malaysia.

3) NEWater, using water recycling technology to recycle used water so that it can be used and consumed safely.

4) Desalinated Water; producing fresh water from sea water by using the desalination system to remove salt from sea water to get fresh water.

In addition, PUB has a mission to consider and provide natural underground water sources. In 2014, there was the project began to search for groundwater sources in the eastern region of Singapore. This project also covers the research and geological water forms development (hydro-geological model) for water storage, including consideration of the implementation of the country's success in measuring on the use of groundwater sources in Singapore (The Straits Times, 2015).



**Figure 3. PUB Manages the Complete Water Cycle**

Source: Adapted from anonymous

### 5.2.2 Urban Environmental Design That Is Related to Water Management

Not only is there water management according to the above vision framework in Singapore but also emphasis on water source designs, water storage areas, including the green areas that help absorb the water of the city as well. Those areas were designed primarily to prevent flooding or to store water for domestic use. Along with the environmental design of those areas, so as to be able to support the various uses and activities in the city, such as

1) Along the rivers, such as the Singapore River, Calang River, Serangoon River, or other canals. The surrounding areas were designed to look like public parks along the riversides, mainly used the large perennials for providing shades. Using sculptures that convey various stories, including street furniture, such as benches, lamps, signs in many spots. Those areas are for a recreation, meeting areas, landmark areas, tourism areas. Including being places for doing activities for urban people, such as drawing, exercising, cycling, and etc.



**Figure 4. Along the Rivers**



**Figure 5. Places for Doing Activities for Urban People**

2) Water storage areas, such as Marina Barrage that is not only a large freshwater dam but also serves as a water barrier to prevent flooding when the tidal bore occurs. It was also designed to be a

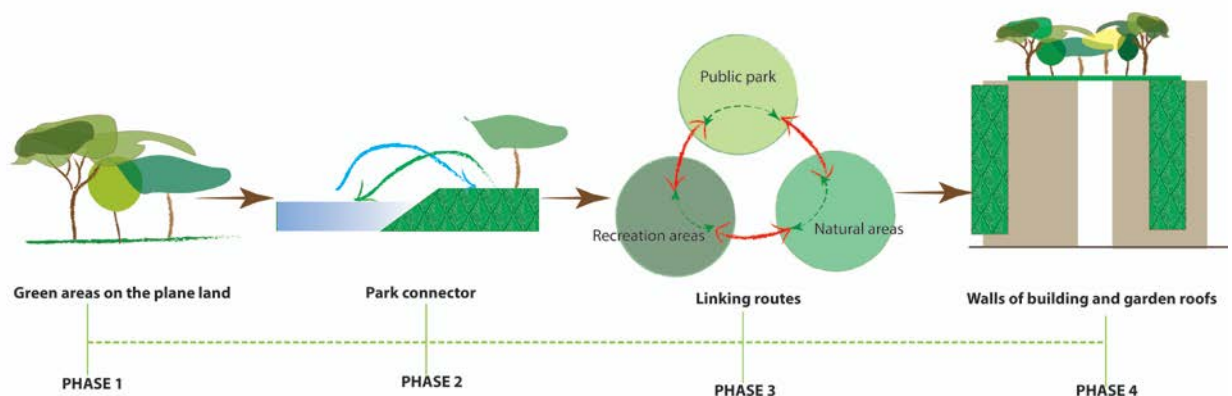
recreation area for people, such as when the currents are steady, it is used for various boating activities. The green area above the dam was designed to be a recreation or activity areas for children, etc. (SCG Experience, 2016).

3) The Researchers from the National University of Singapore (NUS) have released the concept of rainwater storage methods by constructing roads that can absorb water and there are water tanks to store the water underneath. The project was designed and conducted at the Sungei Kadut district. Not only benefits water storage but can also be a way to reduce the risk of flooding (The Straits Times, 2015).

### 5.3 Green Areas, Public Open Spaces and Brown Field Sites

#### 5.3.1 Singapore's Green Areas, Public Open Spaces and Brown Field Sites in General

Singapore's Green Areas Development (as shown in Figure 6). Started by increasing green areas on the plane land all over the urban area. Then, planned the Green & Blue Plan for linking the green areas along the land and waterway routes to be the green network of the whole country called "Park Connector". After that, there was the public park linking routes development, to link recreation areas and natural areas for an easy access just by walking, cycling continuously and with public transportation in the neighborhood. Lastly, the vertical green areas development on the walls of buildings and garden roofs (Na Thalang, 2013) for recreation and water storage of the buildings including, connecting buildings by using the skywalks.



**Figure 6. Singapore's Environmental Development**

#### 5.3.2 Environmental Design That Is Related to the Green Areas, Public Open Spaces and Brown Field Sites

##### 5.3.2.1 Green Areas

1) The Parks and Recreation Department is responsible for planting trees and shrubs around the island. Also, the National Parks Board (NParks) is responsible for planting and taking care of big trees, such as Padauk, monkey pod trees, yellow flamboyant trees, Mahogany and various vines. Along the streets in the city, including providing open space to make it a recreation place. Nowadays, NParks

has planted approximately 1.3 million trees in 300 public parks and more than 2,400 hectares along both side of the roads (Narongkachawana, 2008, p. 46). There are 14% of the public parks of the total area, with the linking routes in the green areas, with a total length of 112 kilometers (Dankittikul, 2011), and is in the process of creating green areas to replace the destroyed parts of the city from development (The Office of Strategy and Area Development Plan, 2014).

2) Singapore has a central network data collection called “The Land Information Network Infrastructure” (LandNet), such as roads data, buildings data, plumbing lines data, public parks data, including tree locations data (Narongkachawana, 2008, p. 47). Therefore, when there are roads, routes, different types of buildings construction or development. Including in various developed zones, there will be a consideration of the original trees that are in the area on how they can be preserved which in turn, affects the consideration of the building layout or design that is suitable for the city landscape.

3) Not only public parks that can be seen in general, almost all sidewalk areas have been provided with a green area proportional to the concrete area.

4) The garden models were created to increase green spaces and to be the recreation areas for the people. Including, to be an important tourist destination in the country, such as the Garden by the Bay.



**Figure 7. The Garden by the Bay**



**Figure 8. The Garden by the Bay**



### 5.3.2.2 Public Open Spaces

1) More public spaces were provided for the community for using in various activities, such as creating public courtyards of the new housing city in Punggol and Bedok to be more lively and active (Policy Brief, 2018).

2) The open spaces of the city were designed as the courtyards with materials that are hardscape and softscape. With the use of open spaces for a variety of purposes or blending together. For example, to be the basin drainage areas, the urban recreation or activity areas, or to create a beautiful scenery for the city and surrounding areas, etc.



**Figure 9. The Open Space to Create Beautiful Scenery for the City and Surrounding Areas**

### 5.3.2.3 Brown Field Sites

There are 3 visions for the urban environment restoration. They are, Livable and Endearing Home, Vibrant and Sustainable City, Active and Gracious, as the details below.

1) Restoring the city's public parks back to be the lively parks. And restoring the land to be sustainable with many projects such as, Remaking Our Heart Land and HDB Greenprint (Housing Development Board) Including the projects that will proceed in the future under the City in the Garden idea.

2) The original railway route areas developing and improving to be "The path of inspirations" by creating 10 different activities. There are activities that improve health and life styles, such as Running tracks and exercise tracks, bike, bicycle lanes, kayaking, nature learning, organic vegetables planting and other activities. With more than 120 points convenient access and can take just 5-minute walk in the community areas. It is safe for all types of users. There is also a campaign for people to participate in space conservation, etc.

## 5.4 *Preservation and Production of Cultural Heritage*

### 5.4.1 Preservation and Production of Cultural Heritage in General

Singapore has a rapid economic development at the regional level. But on the other side, the government is concerned about losing their identity. Singapore's first cultural heritage conserving and creating is resulted by the population's well-being development, such as city planning, zoning Including, the 3 urban historical sites development which are "Chinatown" "Little India" and "Kampong Klam". Resulting in the distinctiveness of each culture. After the declaration of independence, we can see the cultural heritage management with a responsible agency from Singapore. There is a serious operation and specific plan. Resulting in the conservation and creation of cultural heritage and this can be seen in concrete form. And there is also continuous follow-up along with other developments. There are some cultural combinations until present. Not only Singapore's cultural heritage can maintain its unique identity among the cities that have economic growth, but can also be an important part in promoting tourism as well.

### 5.4.2 Urban Environmental Design That Is Related to Cultural Heritage Preservation and Production

1) From urban design with the "Urban grid" style, including clear zoning in the past, resulted in the emergence of various neighborhoods or distinct cultural groups.

2) The Urban Redevelopment Authority (URA) is responsible for cultural conservation or "Historic Sites" together with the National Heritage Board that is in charge of 5 museums to meet the government's objectives to make Singaporeans understand the meaning of the past with the cultural insight (Yeon & Kong, 1996). Nowadays, the URA has undertaken more than 6,800 architectural preservation projects.

3) Building adjustment in the past (Educational institution buildings and administrative buildings) for the new form of use (shopping malls, museums, urban sub-communities' Art galleries). By promoting the use that doesn't cause the loss of identity, see the value and importance (Boonyaprawit, 2012).

4) The concept plans that focuses on promoting the quality of life and aware of identity and maintaining the city identity, such as the Chinese community, Arab community, Ancient British colonial buildings, etc. (The Office of Strategy and Area Development Plan, 2014). Those processes resulted in factual improvements, changed and enhanced the physical characteristics of the areas, reflected in cultural identity (Boonyakieat, 2014).

## 5.5 *Reduction of Pollution and Urban Heat Island Effect*

### 5.5.1 Singapore's Reduction of Pollution and Urban Heat Island Effect in General

The major cause of Global warming is economic development based on industry (Noyraiphoom, 2009, p. 74). Including, from human activities that are related to the entire urban community whether directly or indirectly (TragoonYingcharoen, 2008), such as fuel combustion from the industrial machinery, electrical manufacturing processes, including pollution from vehicle exhaust gases. In the past, Singapore had experienced traffic congestion due to the large amount of people using cars (Foosang,

2018). Therefore, solving problems by collecting high car tax. Also, there's the rule period of usage of the car not more than 10 years or if the usage exceeds the specified period, there must be a higher fee. This caused the owners of personal cars in Singapore to have more expenses than many countries. Not only being able to control the number of personal cars, but can also help control air pollution caused by vehicles.

#### 5.5.2 Urban Environmental Design That Is Related to Reduction of Pollution and Urban Heat Island Effect

1) There's a design and efficient mass transit system development and systematic plan (Asawakovitwong, 2002). Nowadays, Singapore's public transport system which consists of rail transportation systems, including Mass Rapid Transit (MRT) and Light Rail Transit (LRT), public bus and taxi. The incentive for people to use public transport because it's easy to travel and to use the system with a Smart Card that can be used to pay all forms of traveling (PalaEn, 2018). Which the number of Singapore public transport users accounted for about 67 percent. And also targeting the number of users to increase to 75 percent in 2030.

2) There is a compact city design in which people can access to various places in a short distance. By setting the layout for the housing to be located and mixed in the surrounding commercial buildings that people can walk, use bicycles or use public transport (Boonyaprawit, 2012). Including, good zoning arrangement, makes the need to use vehicles and helps decrease various pollutants.

### **6. The Supporting Factors that Contribute Singapore to Have a Good Urban Environment**

#### *6.1 Urban Planning (The Agriculture, Natural Resource and Environment Planning Office (ANEQ), 2014)*

Singapore is known as a country with advanced urban planning development with the most efficient use of land. Cost-effective according with economic promotion guidelines. Be able support the creation of quality of life, valuable lands preservation and conservation. Use a transportation network that does not destroy the environment and is efficient for traffic and cargo transportation. Or even the use of urban planning innovations in the creation of physical beauty to meet and fulfill the people's needs by using Singapore's city planning which is divided into 4 steps as shown in Figure 10.



**Figure 10. Singapore's City Planning**

Source: Adapted from Director Agriculture, Natural Resource and Environment Planning Office (ANEEO), 2014, p. 13.

The first step: Concept Plan, it is a 40-50-year long-term plan which will be updated every 10 years to define the framework for physical development and economic growth in the future. The second step: Master Plan, it is a 10-15-year mid-term urban plan which will be updated every 5 years to convey ideas and strategies from the Concept Plan. The third step: Development Coordination and Land Sale, it is a plan conversion into various land use practices, for a balanced and harmonious conservation and development. The fourth step: Development Control, to supervise the development plan to be in accordance with the model scheme (The Office of Strategy and Area Development Planning, 2014), the guidelines of Singapore city planning can be summarized as follows:

1) There are organizations responsible for a strong city planning. There is a systematic and continuous follow-up and follow-up process. By considering about using limited land to the maximum benefit.

2) There are good city planning plans. As can be seen from the green area development. Including separated the free spaces around each community area. There is housing construction around the city and connecting each area with the expressway system. The city plan is a way to support the Mass Rapid Transit (MRT) system that connects the economic center and the industrial zones in Jurong. Focus on the facilities development, as well as their spaces for recreation and for the city's environment preservation to be livable.

3) There is a city planning that is suitable for the country's context by dividing the region according to the economic roles, specific industrial development zoning. And zone determination for a recreational service businesses and tourism that blends in proportionally with the accommodations (Boonyaprawit, 2012). This clear area of zoning results in easier area development or conservation.

4) The usage of land as Mix Land Use, compact city, transportation planning, convenient transportation. Create balance in land use and transportation by integrating goals that aims at reducing travel necessities goals (Boonyaprawit, 2012).

## 6.2 Management

Singapore has a centralized form of administrative power and policy formulation, also the decision in developing various urban environments comes from the central, including National Environment Agency (NEA), Urban Redevelopment Authority (URA) (Asawakovitwong, 2002, p. 6). Also, ownership of land is owned by the state that is allocated to the public or the private sector for rent, such as the rental for commercial and residential is 99 years, the rental for industrial development is 30 or 60 years, etc. This makes urban environmental planning and implementation can be developed faster, more efficient and continuous. Moreover, the government has policies, regulations, plans, regulations or laws that can support and promote to motivate or force people to follow, making the development to be convenient and easy to manage, these includes:

1) Policies, plans, requirements, such as having a model scheme that is assigned to all government agencies. The NGOs and the public are responsible for maintaining Singapore's fertility environment at all times. All roads or natural routes must be green, including pollution that may cause problems for water and air sources or even residential areas must be managed to not have an impact (Boonyaprawit, 2012).

2) Regulations or laws, such as are laws that strictly punish those who commit crimes against the environment, those who disposed garbage in prohibited areas will be fined 1,000 Singapore dollars, for the first offense. And if repeated crime, will be fined 2,000 Singapore dollars including having to clean the public space for a specified period, etc. (Prommasit, 2017).

3) Motivation, such as in 2017 National Environment Agency (NEA) has set up the 3R prize (Reduce, Reuse, Recycle) for shopping malls, integrated areas and retail stores that carry out environmental protection and organizes environmentally friendly activities or green retails. And also providing fund to support, such as 3P (People, Private and Public) fund, Partnership Fund and 3R Fund (Channel News Asia, 2018).

## 7. Lesson Learned

### 7.1 The Concepts and Theories That Correspond to Singapore's Urban Environment Design Guidelines

From the study of environmental design that helps create a balance between "Development" and "Good quality of life" in the "urban" areas of Singapore, above can summarize the concepts and theories involved as follows.

#### 7.1.1 Sustainable Development

The World Commission on Environment and Development (1987) has given the definition of sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Anambutr (2004) has given the summarization of the guidelines for solving urban degradation and environmental problems according to the concept of Agenda 21 for Sustainable Development as the details below. 1) Prepare housing, facilities and various

areas. 2) Use local materials Energy saving and Renewable Energy. 3) Organize city planning to reduce long-distance travel and support public transportation. 4) Reduce poverty by supporting small economic sectors. 5) Reduce migration to large cities. 6) Settlements must reduce the risk of natural disasters. According to the study found that Singapore has mainly focused on Sustainable Development. The Prime Minister of the Republic of Singapore, Lee Heien Loong has spoken about the topic “Towards a Sustainable and Resilient Singapore” that “Sustainable development has integral to the Singapore Story. We are still a young nation, but we have made much progress on the 17 Sustainable Development Goals (SDGs) under the 2030 Agenda for Sustainable Development, including the six SDGs which the 2018 High-Level Political Forum on Sustainable Development (HLPF) will review in-depth” (Sustainable Development Goals, 2018). Singapore has developed the cities economically, socially and environmentally. That is aimed towards intensive sustainability and seeing clear results from the lives of the people as well as the various awards that Singapore has received.

#### 7.1.2 Smart City

Smart city development is focused on building a city that is balanced between economic development. Create social equality and natural resources and the environment conservation which is based on the concept of sustainable development (Tapananon et al., 2018, p. 4). Can be classified into 6 dimensions: Smart Economy, Smart Community, Smart Environment, Smart Mobility, Smart Energy and Smart Governance. From transport and public housing, to energy management and water treatment, Singapore had developed and adapted some of the world’s most advanced urban solution. Backed by progressive leadership and firm commitment to sustainable development, the city has managed to turn the challenges of urban development into rewarding economic opportunities. Some of those solutions have been replicated and implemented successfully in other cities. Even though Singapore can already be regarded as “smart” city, the government is actively exploring ways to make the city even smarter. Key elements in this approach are the integration of policies, the intelligent use of ICT, and the focus on “livability”; i.e., creating a city in which people are happy to live (Agentschap, n.d.).

#### 7.1.3 Compact City

This concept is a search for the exit of urban design that responds to the concept of sustainable development, focus on compact buildings and reduce fragmentation. The problems of the compact city paradigm are the destruction of the old neighborhoods in the city for more development, congestion /overcrowding problem, environment and pollution in the city center, etc. But Singapore is a country that represents a well-fitting urban design. And can solve the problems from the impact of this concept. There is a city plan that focuses on the use of limited land for maximum benefit while still be able to maintain the city’s old neighborhoods, solves the urban’s congestion by separating zones, such as industrial zones, residential zones. There are the utilities, public assistances, and all necessary facilities in each zone. Each zone is connected with efficient public transportation, making convenient traveling and also help reduce pollution.

#### 7.1.4 Livable City

The residential communities in both urban and rural areas with good environment and quality of life with a caring society, strong community, comfortable, safe in both life and property. There is a good stable economic system. There are unique culture and spirit as the identity of the city and community. The World Health Organization has compiled a livable city, summarized in 5 types as follows: (Anambutr, 2004)

(1) The Cities with (characteristics) good and sustainable physical, environmental and ecological systems. (2) The cities that can meet basic needs and there are various economic systems. (3) There is a good social system that encourages the population to participate, brainstorming, coordinating and teamwork (4) People have good health with good health service system (5) There is a cultural heritage and a good lifestyle. The community is unique. The concept of livable cities is in the main vision of Singapore Sustainable Blueprint 2015 (SSB2015). It is Livable and Endearing Home which can give examples of related operations on this issue (Policy Brief, (2018), such as 1) Supporting environmental sustainability of various areas and buildings through the project BCA (Building and Construction Authority) Green Mark 2). Providing and maintaining green spaces in the city and natural heritage conservation to be aware of being the City in the Garden. 3) Providing opportunities for communities to increase public spaces in the neighborhood. 4) Initiate a city with innovation and creative design. In order to have a better travel and cycling environment starting from Ang Mo Kio, etc. Moreover, Singapore also has a vision for the development in 2 other cities: Vibrant and Sustainable City, Active and Gracious Community which all contribute to the development of Singapore as a livable and sustainable community.

#### 7.2 *The Guideline for Adaptation to Thai Urban Communities*

The study of Singapore's urban environmental design, together with studying the relevant concepts or theories in Singapore, can be applied to create balance between urban development and treatment or a good environment creating for the urban community. The proposal for guidelines of the urban communities in Thailand can be summarized in 4 main topics as follows.

##### 7.2.1 The Guidelines for the City Balancing

###### 7.2.1.1 The Balance between Economic Development and Environmental Protection

1) There is a business center, including various industrial zones along with creating or maintaining a good environment. According to the concept of the "City in the Garden", such as Marina Bay which is one of the projects that support the continued expansion of the Asian business and financial center in Singapore. In those areas, including workplaces, houses, hotels, shops and entertainment venues (The Office of Strategy and Area Development Planning, 2014). Not only there is the environment that is conducive to work and a living but it is also beautiful, suitable for relaxation as well.

2) Singapore always focuses on the consideration of "trees" and "context" before initiate the construction of any project or building. The information can be checked from the central information

system that the government has prepared which benefits the preservation of the area. And is a guideline for designing to have a style or pattern that is in harmony with that context.

3) When there is a green area being developed into an economic area, they will always provide another green area to replace it.

4) There are an open spaces designed for public recreation in various economic or commercial areas, along the roads in the city to create a good environment, reduce congestion and to create a good view for the city along the routes. Using the large perennials for shades and beautiful atmosphere decorations. There is also street furniture which the maintenance of the area is the duty of the private sector or the agency in that area.

5) In the city, there are many sizes of green open spaces designed to allow people to engage in various activities. Including, to be a water drainage in the rainy season.

6) There are many residential designs along with creating a good environment, according to the More Park and Green Space for Resident Needs policy.

#### 7.2.1.2 The Balance between Urban Development and Cultural Heritage Conservation

1) Creating flexibility in architectural conservation, such as bringing the state's old buildings that have been preserved to be used to benefit the city, like department stores, museums, art galleries, while still being able to maintain a beautiful condition of the buildings.

2) Preserve the identity of various zones in the city by being able to carry out commercial or tourism activities together as a Living Museum like Chinatown, Little India and Kampong Klam.

### 7.3 *The Guidelines for Linking Areas and Activities within the City*

#### 7.3.1 Linking Areas and Activities with the Greenways

There are connecting green areas or parks, pedestrian roads, bicycle routes, public space activities parks in the city by using the Greenways. Making the city beautiful, shady, safe, with continuity of green areas and routes in all forms.

#### 7.3.2 Linking Areas and Activities with Public Transportation

There are a variety of public transport systems planning and designs which cover all areas. Making the journey continuous, including using the Smart Card system for convenience and easy traveling connection of the public transport system in the city.

### 7.4 *The Guidelines for Land Using and Urban Planning*

1) There is a compact city plan with fully utilities and facilities. This makes various forms of traveling easier such as walking, biking or using public transport. It is to reduce the use of personal cars for travels.

2) There are clear layouts planning that can separate industrial areas and conservation areas, makes it easier to develop and control the environment. And can still connect to the area and easily access to each area, faster with public transport.



3) With cost effective land use by designing to support a variety of applications, such as urban water catchment areas, not only to protect the city from flooding or keeping fresh water but also to serves as a place for recreation in the city as well.

#### 7.5 The Guidelines for Landscape Elements Designing that Promote the Good Environment of the City

1) Plants Selection, such as large perennials to provide shade along many routes in the city. Including, decorating the environment with beautiful plants and always in good maintenance.

2) There are facilities designs, such as benches, trash that are in harmony with the environment and convenient to use.

3) There is Lighting Master Plan which is used to arrange the lighting elements for various buildings and create a good landscape for the city at night.

4) In each zone, there are road element designs that conveys the identity of that community. Not only to create a cultural landscape for the area but can also promote tourism.

### 8. Conclusions

As can be seen that Singapore has many resource constraints compared to Thailand, such as there are limited size of areas with small island conditions, it is not enough to live or engage in economic activities. And fresh water that is not sufficient for consumption and domestic consumption. Finding a way to create a balance between “demand” and “limited resources” is an important issue in national development. Which can be said that from these problems, the environment in Singapore has been conscientiously developed. And to become one of the countries that have economic growth in the forefront of the world, while people in the country can have a good quality of life, Singapore’s government believes that it must come from “Good urban environment”.

On the other side, building confidence by creating a sense of the country ownership together.

As well as the participation between the state and the people in the national development, process are all important factors that make Singapore known as a country with sustainable development; both economically, socially and environmentally as we see nowadays.

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