ENVIRONMENTAL DESIGN FOR MENTAL HEALTH: A CASE STUDY OF SILOM-SATHORN NEIGHBORHOOD

BY

MISS SUPISARA KHUMRUANGRIT

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF URBAN DESIGN
URBAN DESIGN AND DEVELOPMENT (INTERNATIONAL PROGRAM)
FACULTY OF ARCHITECTURE AND PLANNING
THAMMASAT UNIVERSITY
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ENTITLED

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was approved as partial fulfillment of the requirements for the degree of Master of Urban Design

on January 4, 2023

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ABSTRACT

Environmental Design for Mental Health: A Case Study of the Silom-Sathorn Neighborhood is the study of how to design the physical environment and infrastructure to improve the quality of life, particularly in terms of mental health. The study examined existing theories relating to environmental elements and mental health in order to propose a new environmental development guideline for mental health, and then applied the guideline to improve the physical condition and resolve an urban problem pertaining to site selection.

Since the COVID-19 epidemic, individuals have experienced economic insecurity, worry, life disruption, stress, and mental and physical health difficulties. Thailand is one of the countries facing severe strain as a result of the pandemic. The mental health statistics of Thailand indicate that urban dwellers experience less happiness and greater stress. Bangkok also faces a major mental health crisis, particularly among adolescents and those of working age (National Statistical Office of Thailand, 2020). A well-designed, accessible, and affordable environment is associated with improved mental health.

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This thesis seeks to investigate the relationship between urban environment and mental health in order to build an urban environment that positively promotes the mental health of the urban populace. By adhering to the new environmental design criteria, it is anticipated that the mental health and stress levels of urban residents who circulate through developed urban features will improve.

The design based on research will be implemented in the chosen site, the Silom-Sathorn area. The property is situated in the heart of the Central Business District (CBD), which is comprised of high-rise office buildings, dense development, and a large number of office workers. Due to the abundant public space surrounding the BTS station and office sector, this region has a great potential for using the environmental design guideline for mental health.

The research results are separated into two categories. The first step consists of identifying the correct guidelines for the design of physical environment that promotes well-being and mental health. The second step is to apply the guideline to the case study area of choice.

Keywords: Environmental Design, Urban Design, Mental Health

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CHAPTER 1
INTRODUCTION

1.1 Background and Problem Statement

Since the COVID-19 epidemic, individuals have experienced economic insecurity, worry, life disturbance, stress, and difficulties with their mental and physical health. Thailand is one of the countries facing severe strain as a result of the pandemic. The mental health statistics for Thailand indicate that urban dwellers experience less happiness and greater stress. Bangkok's urban region also faces the most severe mental health crisis, particularly among adolescents and those of working age (National Statistical Office of Thailand, 2020). To minimize stress and improve the mental health of Bangkok's urban population, the right design and development of urban features can foster an atmosphere that promotes positive mental health. The study will focus on urban environmental design to create a mental health-friendly urban environment.

1.1.1 Urban Environment and Mental Health Definition

This study is primarily concerned with the urban environment and mental health. We would want to clarify the meaning of both terminologies utilized and applied in this study.

The urban environment is the environment created by humans, consisting of towns, cities, and suburbs with a high population density, infrastructure, and constructed environment. Based on human activities, demands, and behavior, urban or highly developed areas place greater emphasis on socioeconomic development and less emphasis on agriculture-related programs. This thesis focuses on the physical environment that can be designed and developed as the urban environment.

Psychological, emotional, and social wellbeing comprise mental health. Based on information from the World Health Organization (WHO), *"mental health is a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make*

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a contribution to his or her community" (WHO, 2018) When mental health is discussed, the states of stress and depression are referred to.

1.1.2 The Relationship of Urban Environment and Mental Health

The environmental element is one of the determinants of mental health problems in the city. The urban environment can have an effect on people by both increasing stress and decreasing protective factors. The experience of congestion, crowding, noise, odor, sight, and pollution all contribute to the stress. The following factors can contribute to the occurrence of overload.[1] As a result of the overload, individuals tend to retreat from social activities, which can lead to increased stress and mental disease. Second, by diminishing the protective factor[2], city dwellers tend to have less access to protection. For instance, lack of access to the natural environment, fewer opportunities for physical activity, long working hours, poor habits, and less free time. Experiencing stress stimulation factors can also result in feelings of insecurity, diminished privacy, and decreased sleep. These events can affect the lowering of protective factors, which is a risk factor for the development of mental health issues.

The urban environment can increase the likelihood of mental health problems. In the study of *Cities and Mental Health* (Gruebner, 2017) it has been mentioned that *"The risk for serious mental illness is generally higher in cities."* A 40 percent increased chance of depression, a 20 percent increased risk of anxiety, an increased risk of schizophrenia, and increased loneliness, isolation, and stress. However, the design of urban features can contribute positively to mental health and well-being, promote good mental conditions, avoid mental disease, and aid those with mental health concerns.

[1] "Overload is a psychological condition in which situations and experiences are so cognitively, perceptually, and emotionally stimulating that they tax or even exceed the individual's capacity to process incoming information." (American Psychological Association Dictionary of Psychology)

[2] "Protective factor is a clearly defined behavior or constitutional (e.g., genetic), psychological, environmental, or other characteristic that is associated with a decreased probability that a particular disease or disorder will develop in an individual, that reduces the severity of an existing pathological condition, or that mitigates the effects of stress generally." (American Psychological Association Dictionary of Psychology)

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1.1.3 The Impact of COVID-19 on Mental Health

The effect of COVID-19[3] on mental health can be deduced from the emotional condition during the pandemic and social restriction policies, such as physical separation, activity limitation, lockdown policy, and staying at home. Four facets of the pandemic's etiology of mental health disorders are discussed. The first aspect is the emotional condition brought on by infection. The physical sickness caused by COVID-19 is more likely to develop into a respiratory illness that can be fatal, and it causes poor mental health in individuals. The second factor is the effect of the financial situation during the epidemic; the COVID-19 caused the world economy to decline, resulting in unemployment. Mental depression is a result of the dire economic condition and the difficulty of unemployment. The third factor is to family; during a lockdown, a person's family status and living situation might lead to stress and sadness. The final factor is the lack of social opportunities. No social contact is permitted because of societal limitations during the pandemic. Loneliness and mental distress can arise in the absence of social engagement.

Following *The World Happiness Report* (2021), the global happiness state as a whole is declining. In Thailand, the happiness statistics suggest that people experience poor happiness and a 28.6 percent increase in worry. Thailand's mental health state during the COVID-19 pandemic[4] was discovered that 28% of adolescents suffer significant levels of stress, 32% are at risk for depression, and 22% pose a suicide risk. Even before the epidemic, there was a high frequency of adolescent suicides, a high level of stress, and low levels of happiness in teenagers and those of working age in Thailand (Department of Mental Health, 2021).

As a result of the COVID-19 pandemic and the physical characteristics of Bangkok, residents face a high risk of depression and stress.

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[3] Coronavirus disease 2019 or COVID-19 is an infectious disease caused by the virus named SARS-CoV-2 virus. The virus can be transmitted in the air especially during breathing, talking, coughing, sneezing, etc. People who get infected with COVID-19 are most likely to develop respiratory illness from serious illness to death.

[4] Following the data of mental health condition in Thailand during COVID-19 pandemic, the information period is referring to the year of 2020 to 2021. The information is published in 2021 from the Department of Mental Health in Thailand.

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1.2 Research Question

The thesis is framed following these research questions:

(1) What are the quality of elements in urban environment that influence the mental health?

(2) How to design an urban environment that can improve the mental condition in post-pandemic situation?

The purpose of the study is to comprehend the relationship between the urban environment and mental health by investigating the physical urban element that can influence good mental health and the condition of those elements in great detail in order to develop new environmental design guidelines that suit the behavior of the urban population in the aftermath of a pandemic.

1.3 Objectives

This thesis is to investigate and examine the connection between the urban environment and mental health in order to build an urban environment that influences the improvement of the mental health of the urban population. By adhering to the new environmental design criteria, it is anticipated that the mental health and stress levels of the urban population will improve as they pass through the designed urban elements.

On the location designated between the Silom and Sathorn neighborhoods, the research-based design will be implemented. The selected location is situated in the heart of the Central Business District (CBD), which is characterized by high-rise office buildings, high-density construction, and dense office worker populations. Due to the abundant public space surrounding the BTS station and office sector, this region has a strong potential for using the environmental design guidelines for excellent mental health.

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1.4 Scope and Limitation

The scope and limitations of this thesis pertain to the study's limitations, the focus group's scope, and site selection. Due to the scope of the investigation, this thesis examines the connection between the urban environment and mental health. This thesis defines the urban environment as representing the urban physical element. The urban aspect that can be created physically, including green space, transportation, pollution, public utilities, and facilities. In this thesis, the definition of mental health is represented by depression and stress. The scope of the focus group, based on general mental health statistics from the National Statistical Office of Thailand, indicates that teenagers (15 to 24 years old) have the lowest levels of happiness, followed by adults (25 to 59 years old) (National Statistical Office of Thailand, 2020). Also, because the COVID-19 pandemic is increasing the high rate of stress and low levels of happiness in Thailand's overall population, the research focuses on the study of individuals who are teenagers and of working age (adults and young adults) and have a low level of happiness and a high risk of depression and stress.

The selected site is located in Bangkok's Central Business District (CBD), which is the Silom-Sathorn neighborhood. The region is well-known for its high-rise business offices and condominiums, heavy traffic during rush hour, and densely populated office hours. The research focuses on the area of public space connected to the BTS station that has a high accessibility potential.

1.5 Benefit of the Study

The research results are separated into two categories. The first step consists of identifying the correct guidelines for the design of physical environment that promotes well-being and mental health. The second step is to apply the guideline to the case study area of choice. The new environmental design guidelines for mental health comprise of urban features that can affect people's mental health, such as green space, social contact, public transportation, utility, facility, etc. Following the

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data analysis and new guideline approach, the Silom-Sathorn neighborhood will be chosen as a case study area for the deployment of new guidelines.

1.6 Research Framework

There are five components to the study's methodology. The first section consists of preliminary research and identification of a study framework. The second section reviews the relevant literature and case studies. The third section identifies the urban environment factors that have a positive effect on mental health. The observation and analysis of the selected case study constitutes the fourth section. The final section is the research-based design suggestion.

After conducting preliminary research, the technique of the thesis consists of evaluating theories and case studies to determine the urban environment factors that influence mental health. This thesis uses three theories as references; *The study of Urban Design and Mental Health* (the Centre for Urban Design and Mental Health), *Urban Sanity* (Todd Litman, 2016), and *the Restorative City* (Jenny Roe and Layla McCay, 2021). The case study evaluation includes an examination of urban traits and aspects in Hong Kong and Tokyo. In addition, the study of behavior changes caused by COVID-19 is included in the thesis in order to build a new guideline for environmental design for mental health in the aftermath of a pandemic.

Before implementing the research-based design to the selected case study, which is the Silom-Sathorn area, we must conduct primary field research, secondary research, and data analysis to determine the site's characteristics and problem. In this thesis, on-site observation is the principal research method. Secondary research involves the use of data from many sources, such as a report, book, or scholarly paper. In order to suggest the design development of the Silom-Sathorn neighborhood, it is necessary to analyze the data and assess the site's state. And using the new environmental design guidelines to the design development concept in order to create an atmosphere conducive to mental health in the city.

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Figure 1.1 The research framework of the Environmental Design for Mental Health: A Case Study of Silom- Sathorn Neighborhood

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CHAPTER 2
LITERATURE AND CASE STUDY REVIEW

This thesis' literature and case study review contains three primary informational elements. The first section analyzes environmental elements that influence mental health from a theoretical perspective. The second section contains a review of the case study. The final segment examines alterations in behavior caused by the COVID-19 epidemic.



Figure 2.1 Literature and case study review framework

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This thesis's literature research and case study analysis will be used to create a new environmental design guideline for mental health. The process development utilizes the three primary sections of information, including the theory review, case study review, and post-pandemic trend sections. There are four stages in developing the new environmental design guideline for mental health, including the individual studying each mental health-related theory to determine the purpose of the theories, applying the theories to case study analysis, determining the relationship and similarity of the mental health theories to the development of the framework, and considering the post-pandemic behavior change.



Figure 2.2 Framework diagram of new guideline development

2.1 Individual Studying on Mental Health Related Theories and Identify the Important of Each Theory

In this thesis, three reference approaches are employed to examine the literature and theory pertaining to environmental elements that affect mental health. The first method is the study of *Urban Design and Mental Health* (Centre for Urban Design and Mental Health). The second method is *Urban Sanity* (Todd Litman, 2016). And the last method is *the Restorative City* (Jenny Roe and Layla McCay, 2021).

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2.1.1 Urban Design and Mental Health

The Centre for Urban Design and Mental Health (UD/MH)[5] created the notion of Urban Design and Mental Health to explain the relationship between urban design and mental health. In order to incorporate urban design into the physical environment, urban design can affect mental health, prevent mental illness, and assist those with mental health issues. In this idea, eight urban components that contribute to a mental health-improving urban environment are identified.



Figure 2.3 Summary diagram of urban design and mental health

1) Green Space and Access to Nature – incorporated green elements into the physical landscape and ensured that people have daily access to urban nature. The combination of green elements and the physical environment must be well-managed to prevent the space from becoming hazardous. The green element should encourage social connection, physical activity, and sports, allowing people to interact with nature in accordance with the Biophilia theory.[6] (Erich Fromm, 1973).

[5] Centre for Urban Design and Mental Health (UD/MH), a start-up thinks tank organization that focused to study on how to design better mental health in the city

[6] "*Biophilia theory is an idea that humans possess an innate tendency to seek connections with nature and other forms of life. The term* biophilia *was used by German-born American psychoanalyst Erich Fromm in* The Anatomy of Human Destructiveness *(1973), which described biophilia as "the passionate love of life and of all that is alive." The term was later*

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Using aesthetic appreciation to relieve stress (*Stress reduction theory*[7], Ulrich, 1983), and creating a space that facilitates attention without concentration (*Attention restoration theory*[8], Kaplan, 1989).

2) Active Space for Exercise – created the urban environment that stimulates exercise and sports participation. The urban environment should be designed to encourage walkability and bike-ability, good public infrastructure and pedestrian routes, the use of street furniture to generate attraction spots and physical activity, recreation spaces, and sport compact areas, and to provide recreation and sport compact areas. Designing a public place to encourage fitness and activity is beneficial to mental health. Exercise can help the brain make serotonin chemicals.[9] Serotonin is one of the brain-derived neurotrophic factors that excite neurons in the brain, promote sleep, relaxation, and stress relief, and foster social interaction and self-esteem.

3) Pro-social Places to Encourage Positive Social Interaction – the design of urban space should encourage social interaction, mixed-use, and compact places. To improve walkable neighborhoods, expand urban amenities and street furniture, create multi-functional public space, encourage ground activity, and design

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used by American biologist Edward O. Wilson in his work Biophilia *(1984), which proposed that the tendency of humans to focus on and to affiliate with nature and other life-forms has, in part, a genetic basis*." (Encyclopedia Britannica, 2014)

[7] "*Stress reduction theory (SRT) postulates that contact with some kinds of natural settings will reduce the time it takes to recover from a stressful event (Bratman, Hamilton, Daily, 2012; Ulrich, Simons, Losito, Fiorito, Miles, & Zelson, 1991)"* [William C. Sullivan, and Rachel Kaplan (2015). Nature Small step that can make a big difference. Health Environmental research and Design Journal]

[8] "*Attention restoration theory (ART) postulates that contact with nature helps people recover from mental fatigue. In order to pay attention to something, we must block out distractions from the things going on around us and from the thoughts that are constantly swirling around in our heads. The mechanism in our brains that blocks these distraction fatigues with use and after a while, it becomes increasingly hard to focus, make decisions, and remain at ease. But, according to ART, having a view to a setting that contains natural elements (e.g., trees, flowers, water), or actually being in such a space for even just a few minutes, can restore your capacity to focus because it provides the mechanism necessary to block distractions an opportunity to rest and restore (S. Kaplan, 1995, Kaplan, Kaplan, & Ryan, 1998)."* [William C. Sullivan, and Rachel Kaplan (2015). Nature Small step that can make a big difference. Health Environmental research and Design Journal]

[9] Serotonin chemical - biological function is complex and multifaceted, modulating mood, cognition, reward, learning, memory, and numerous physiological processes such as vomiting and vasoconstriction

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activities and programs that are compatible with the area's users to prevent overload. By fostering social engagement in the community, people can build self-esteem, self-confidence, empathy, and a sense of belonging. Getting away from the feeling of loneliness, anxiety, and isolation cause mental depression.

4) Safety in the City – a secure environment must incorporate both crime prevention and transportation safety. Adapting Crime prevention through environmental design (CPTED)[10] that consists of natural access control (entrance, fence, and hedge), natural surveillance (increasing visibility), territorial reinforcement (private and public space), and maintenance (Broken windows theory[11]). To improve traffic safety, the transportation route should be designed to encourage walking and cycling.

5) Sleep – developed for optimal sleep conditions. Good building insulation and green barriers can aid in preventing traffic-related noise pollution. Automated street lighting can help reduce light pollution. Those pollutants that can interfere with sleep. The quality of one's sleep can have a detrimental effect on one's thought process, and those with sleep problems such as insomnia[12] might develop depression and anxiety.

6) Transportation and Connection – To promote active commuting and transit-oriented development, the transportation alternatives and transit, bike sharing, bus route, pedestrian and open space have been enhanced. Inadequate transit and travel time might result in tension, worry, hostility, and poor sleep.

7) Economic Stress and Affordability in the City – Designed to reduce economic stress, urban aspects such as affordable housing, reasonable transportation alternatives, and inclusive and universal design should be affordable and accessible to all. Having access to the economic, educational, social, and cultural

[10] Crime prevention through environmental design (CPTED) is the design suggestion on the building design, landscaping, and outdoor environment that either encourage or discourage crime. CPTED aims to minimize crimes by reducing criminal opportunities and fostering to have positive social interaction.

[11] The broken windows theory states that any visible signs of crime and civil disorder, such as broken windows (hence, the name of the theory) vandalism, loitering, public drinking, jaywalking, and transportation fare evasion, create an urban environment that promotes even more crime and disorder (Wilson & Kelling, 1982).

[12] Insomnia is a sleep disorder that leads to trouble falling asleep.

advantages of the city can be beneficial to mental conditions. Typically, economic gaps occur in metropolitan areas, and those with inferior living conditions tend to be surrounded by decaying infrastructure, which increases the likelihood of drugs and urban crime.

8) Air Pollution – By providing green space to trap particular matter, urban canopy, implementing the traffic reduction method, relocating industry from densely populated areas, and encouraging people to reduce carbon-generated activity by promoting walkability, urban design can help reduce the exposure to air pollution. The heavy metals in air pollution can induce side effects that contribute to schizophrenia; planning urban development to decrease or prevent pollution would boost mental health.

Reflection – The study of *Urban Design and Mental Health* can be used as a guide for identifying physical components that may influence mental states and influence people's behavior. Data information in the study is well-described and simple to comprehend. In addition, the physical urban design features listed in this theory span a variety of factors that influence mental health, including environmental, social, and economic factors.

2.1.2 Urban Sanity

Urban Sanity: Understanding Urban Mental Health Impact and How to Create Saner, Happier Cities is the report written by Todd Litman[13]. The purpose of this research is to study how urban life affects people's mental health and happiness, as well as how to develop healthier and happier cities.

Included among the urban conditions that can affect mental health and happiness are the concentration of mental illness risk (poverty, addiction, etc.), substance abuse, social isolation and loneliness, noise and light pollution, toxic pollution, excessive stimulation and stress, crime, crowding, economic stress, transportation conditions, and inadequate access to nature.

[13] Todd Litman, a founder of an independent research organization that focuses on developing an innovative solution for the transport problem called Victoria Transport Policy Institute.

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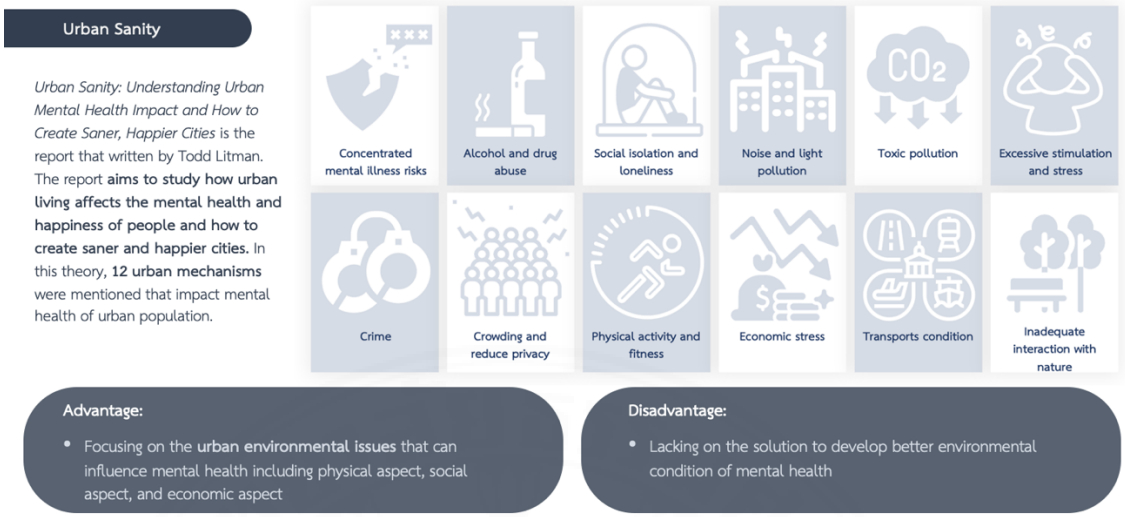


Figure 2.4 Summary diagram of urban sanity

1) Concentrated Mental Illness Risks – the cluster of concentrated mental illness people[14] likely to have a higher risk of mental illness and lower levels of happiness. Even if there are more options to receive support services in urban areas, economic and social situations might create a critical situation for persons with a high mental disease risk concentration. Moreover, living in a setting with a high concentration of persons at risk for mental disease might result in mental health concerns and decreased happiness. Providing the community with mental health assistance and therapy, drug and alcohol treatment services, economic opportunities, and career training centers helps lower the likelihood of developing a mental disease.

2) Alcohol and Drug Abuse – substance addiction can result in mental symptoms that lead to mental disease. Geographically, substance abuse can occur depending on community culture, availability of alcohol and drugs, and access to treatment. This setting facilitates easy access to substances that can lead to alcohol and drug dependence. Creating a community and neighborhood with an integrated substance abuse prevention and treatment program can lower the likelihood of developing mental symptoms and mental disease as a result of substance usage.

[14] concentrated mental illness people including poverty, homeless, physical and mental disabilities, drug and alcohol abuse, and social alienation.

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3) Social Isolation and Loneliness – due to the large amount of urban migration in urban areas, urban inhabitants who live alone are more likely to feel social isolation and loneliness, which can contribute to mental health problems and unhappiness. As a result of their concern of crime and strangers, many urban inhabitants struggle with difficulties of mistrust. The danger of social isolation and loneliness can be lowered by living in a community that is warm and accepting. Creating trust and enjoyment in a community through the design of a friendly neighborhood environment, community public space, and spaces for social interaction and activity requires the engagement of social interaction and activity.

4) Noise and Light Pollution – light and sound pollution can induce stress and disrupt sleep. Noise and light pollution tend to grow in metropolitan areas as population density rises. Designing and integrating urban components that can lessen the impact of pollution, such as noise-isolating streetscape design, promoting electric vehicles, considering the types of street lighting, etc.

Table 2.1

Community noise and light reduction strategies

Noise Reduction Strategies	Light Reduction Strategies
• Regulate noise generation • Restrict noisy vehicles and reduce traffic speeds • Restrict sirens and alarms • Restrict noisy industrial, construction, and landscaping activities • Establish building insulation standards • Develop street trees, walls, and other noise barriers	• Orient street light downward • Sign and building lighting restriction • High-quality window covers • Light design education

Source: Todd Litman, 2016

5) Toxic Pollution – exposure to hazardous particles can enhance mental illness, which can lead directly to anxiety, sadness, anger, and behavioral issues, and indirectly to an increase in the crime rate. These toxic particles are produced by cars and industrial activities, particularly in high-traffic areas. Designing an urban setting that can reduce hazardous emissions by proposing a compact

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neighborhood that locates residential, commercial, educational, and necessary facilities in close proximity. In addition, changing from fuel to electric automobiles.

6) Excessive Stimulation and Stress – the urban environment might result in stimulation overload, which can increase mental stress. Being busy and noisy, extremely competitive in a variety of industries, including the job, or engaging with strangers in a city can cause excessive stimulation and stress. Designing the urban environment such that individuals have access to activities that promote relaxation, such as green space development, support for calming activity, urban art and amenity, and recreation programs, can improve the mental health of urban residents.

7) Crime – mental disorder that is both cause and effect of criminal behavior can be influenced by fear, which tends to exacerbate stress and trust issues. The urban setting has a greater crime rate since it is the location of business and commercial districts and has a large concentration of individuals with mental illness. Creating compact and mixed-use programs, walkable neighborhoods, and implementing a security surveillance system are examples of designing an intervention program to reduce the danger of crime.

8) Crowding and Reduce Privacy – inhabitants may experience stress due to overcrowding and a lack of privacy. Within the urban region, housing with space and seclusion is more expensive and costs more. Few individuals can afford the price of houses in superior condition. Creating adequate living conditions by designing cheap housing with the proper density will lower the incidence of mental disorders.

9) Physical Activity and Fitness – physical fitness and exercise help prevent mental illness and improve mental health. In urban areas, there are numerous workout options, such as the gym, which cost time and money, but this solution may not apply to everyone. Designing an urban environment that stimulates physical exercise and fitness, such as through enhancing walking and cycling, proposing a compact and mixed-use program, public recreation area, and sports facilities is an example of urban planning that promotes physical activity and fitness.

10) Economic Stress – economic stress contributes to psychological problems and unhappiness. The urban environment requires a greater cost of living, which restricts access to better facilities, such as well-maintained housing. To decrease

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financial stress in the urban region, more inexpensive housing, transportation, economic support services, and job training centers should be made available.

11) Transport Conditions – the quality of transportation might affect mental health and happiness. Commute stress can be caused by inconvenient public transportation, time-traveling during journeys, and heavy traffic. Creating an urban environment that encourages walking, enhancing security surveillance, maintaining and managing public transit well, lowering journey time, and implementing a mixed-use program can reduce commute stress.

12) Inadequate Interaction with Nature – possessing the ability to interact with nature can promote mental health and happiness. Integrating green space into urban aspects such as parks and recreational places, streetscapes, community gardens, green infrastructure, indoor plants, and biophilic architecture.

Reflection – The study of *Urban Sanity* provides a critical perspective on the urban environment mechanisms that can effect mental health difficulties. This study examines the causes of urban health problems that have a detrimental impact on mental health, as well as the solutions to each problem. In addition to physical urban difficulties, the idea also covers social and economic factors that increase the likelihood of mental illness.

2.1.3 Restorative City

Restorative City is the new urban design framework for improving mental health and social interaction. Restorative City is introduced by Jenny Roe[15] and Layla McCay[16]. Through the design of physical forms, color, nature, water, and roadways, this framework proposed creating a city capable of reducing stress, sadness, and anxiety and sustaining overall well-being.

Included in the study of restorative city theory are green, blue, sensory, neighborly, energetic, playable, and inclusive cities.

[15]Jenny Roe (Director of the Center for Design and Health)

[16]Layla McCay (Director of the Centre for Urban Design and Mental Health)

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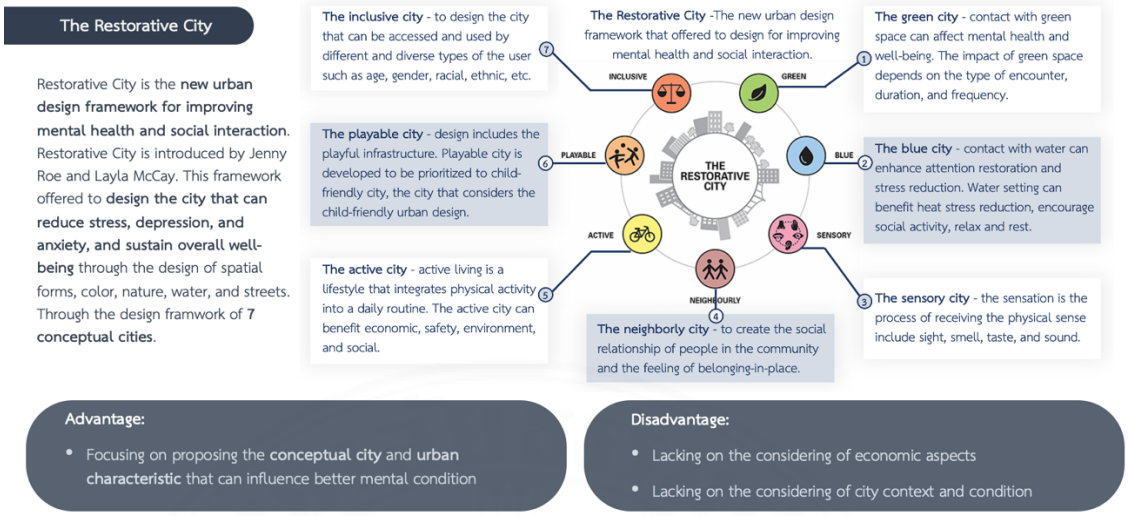


Figure 2.5 Summary diagram of The Restorative City

1) The Green City – urban green spaces have a positive effect on mental health and wellbeing. The effect of green space is contingent on the nature, duration, and frequency of encounters with nature.

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Table 2.2

The Green City Theory

Key concept of green city	• Urban green space • Incidental nature exposure (contact with nature by the incident) • Intentional nature exposure (contact with nature by intention) • Dose-response relationship (relationship between green space and accessibility potential)
Theory of green city	• Impact of green space depends on types of natural setting and types of contact • 4 key pathways: Psychological mechanisms, Biochemical mechanisms, Increased opportunities for physical activity and social interaction, and Direct physical effects including sleep.
Impact on mental health	• Green cities help reduce depression and improve mood • Green cities reduce stress disorders (PTSD) • Green cities mitigate the symptoms of schizophrenia and other psychotic disorders • Green cities help boost cognitive health • Green cities improve social cohesion
Modifiers of impact	• Demographic and socioeconomic factors (age, gender, race, income, education, etc.) • Cultural modifiers: usage and benefit of green space • Health equity: reduce the gap in health inequity between rich and poor
Design approaches for green city	• Amount of space • Accessibility • Types of green space • Views (increase in visual access) • Quality perceptions (management and control) • Biodiversity quality • Climate and seasonality • Increasing the amount of time in green space

The green city's design ideas are to maximize the green space area in both inadvertent and deliberate nature exposure, to assure the accessibility of green space, and to invest in everyone.

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Table 2.3

Design principles for the Green City

General principles	• Maximize the use of green space both direct exposure and indirect exposure • Maximize green space in the residential area • Maximize accessibility to green space • Investment green space for children and older people
Neighborhood scale	• Front porches and gardens • Green roofs and walls • Street trees • Connected walkable and bikeable corridors • Pocket parks • Large urban park • Accessible transport
City scale	• Internal courtyards with the natural setting • Views of green space from the workplace • Green roofs and walls • Street trees • Pocket parks • Connected walkable and bikeable corridor to work
Accessibility to green space	• Connect pocket green space with green street • Open up schoolyards to public • Use lighting to keep the park and sports area safe to walk • Provide seats and public toilets • Provide facilities for outdoor recreation activity • Connected with an online resource for detail and location of green space

2) The Blue City – The experience of water can affect mental wellness. Contact with water can improve concentration restoration and reduce stress. The presence of water can reduce heat stress and enhance social activity, relaxation, and rest.

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Table 2.4

The Blue City Theory

Key concept of blue city	• Blue space • Blue care (nature-based treatment by using blue space) • Heat-island effect
Theory of blue city	• Impact of blue space depends on types of water setting and types of contact • 3 key pathways: Psychological mechanisms, Direct physical effects, and increased opportunities for physical activity and social interaction.
Impact on mental health	• Blue cities may reduce the risk of depression and improve mood • Blue cities can reduce stress • Blue cities can support social health
Modifiers of impact	• The change of water quality from being used may create a negative impact on mental health, proper quality maintenance is needed to improve mental condition
Design approaches for blue city	• Coastal cities • Inland waterways • Designing therapeutic blue space • Blue space, heat street ,and mental health • Leveraging the sustainability and economic drivers of blue space development • Inclusive blue environments

The design principles for the blue city are to create physical and visual access to water features for all people, to create an experience with water, to integrate green and blue infrastructure, and to encourage sports and social contact.

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Table 2.5

Design principles for the Blue City

General principles	• Maintain residential visibility and public access to waterfront nearby residential area • Provide the opportunity to experience safe water play • Integrated waterways along the pedestrian network • Considering hybrid park, water features that support social activity
Neighborhood scale	• Water play for children • Attractive planting and seating along the water features • Interconnected waterways with green corridors • Hybrid park that encourages sports and social activity • Climate adaptation system (water management system, rain garden, street stormwater drainage system, etc.)
City scale	• Water fountains to mitigate noise pollution • Urban water walls capture the cycle of water • Riverside park • Flexible waterfront space with activity and event • Canalside trails that linked green corridors • Climate-efficient sponge city designs • Heat-proof city design • Floating island for biodiversity and recreation

3) The Sensory City – sensation refers to the process of receiving physical senses, such as sight, smell, taste, and sound. Design is influenced by the information that can be received, taking into account how people perceive and interpret their surroundings.

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Table 2.6

The Sensory City Theory

Key concept of sensory city	• Sensation • Perception • Cognition • Salutogenic (soundscape and smellscape)
Theory of sensory city	• Impact of sensation depends on the body receiving the information of the surrounding environment (aesthetics, sound, scent, etc.) • 3 key pathways: Sensory evocation of settings for which humans have an evolutionary preference, An ambience that encourages people's engagement in mental healthy activity, and Reduces sleep disruption.
Impact on mental health	• Sounds can affect mood, stress, and cognitive function • Sights can reduce depression and affect mood • Smells can be a risk factor for mood disorders and affect recovery • Touch can reduce depression and anxiety • Tastes can support the physical health of people with mental health problems and contribute to feelings of belongingness • The sixth sense: ambience and affect the atmosphere
Modifiers of impact	• Social value (can be both positive and negative)
Design approaches for sensory city	• Sound: reducing unwanted noise and increasing access to restorative soundscape (Salutogenic soundscape, noise management) • Smell: harnessing the smellscape to create belongingness (Salutogenic smellscape, reducing unpleasant smells) • Sight: leveraging the visible cityscape (reducing monotony and increasing legibility, improving safety through urban lighting design, public art and creative design) • Touch: nudging people to use restorative environments through haptic experience • Taste: maintaining health and evoking belongingness • Combined sensory design

By considering sensory design and design to prevent unpleasant feelings, the design concepts of the sensory city strive to create an urban environment in which people can experience and perceive pleasant sensations.

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Table 2.7

Design principles for the Sensory City

Seize opportunities to include salutogenic sensory design with evidence of promoting mental health and wellbeing	• Use nature-based calm sound and environment • Control appropriate smell in public space • Increase aesthetic design and create local characteristic • Integrated art • Use LED lighting at night • Use textural variation including natural-based texture design • Urban farming and community market • Sensory garden design
Reduce exposure to unpleasant sensations by decreasing production and transmission	• Reduce people's exposure to unpleasant sensory output • Reduce traffic density by investing in pedestrian and cycling infrastructure, green public transportation • Reduce traffic noise by reducing volume, speed, and noise transmission. Integrating natural traffic calming features and low-speed zone • Mask traffic noise with a green barrier

4) The Neighborly City – this topic's fundamental idea is to foster social relationships among community members and a sense of place-based belonging. Social connection can boost self-esteem, confidence, and empathy, so enhancing a sense of community support and belonging.

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Table 2.8

The Neighborly City Theory

Key concept of neighborly city	• Belonging-in-place • Community • Conviviality (liveliness) • Loneliness • Neighborliness • Social isolation • Social capital • Social cohesion
Theory of neighborly city	• Impact of a neighborhood depends on the environmental condition, facility, public space, and social interaction. • 3 key pathways: Increased social capital, Reduced social isolation and loneliness, Psychological and practical investment in pro-social infrastructure and ambience.
Impact on mental health	• Neighborly cities reduce depression • Neighborly cities reduce anxiety • Neighborly cities may protect against psychosis • Neighborly cities can help reduce symptoms of dementia • Neighborly cities reduce suicide
Modifiers of impact	• Age • Immigration • Homelessness
Design approaches for neighborly city	• Housing (availability, affordability, adequacy, location, stigma, cohousing, housing design for social opportunity, privacy to enable sociability) • Beyond housing (social settings within the wider neighborhood) • The pet factor • Participatory settings within the neighborhood • Beyond the neighborhood transit design

The goal of the design principles of a neighborly city is to create a neighborhood with strong relationships and a sense of belonging. Social engagement will be incorporated into the design process in order to facilitate the formation of a suitable community for the user.

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Table 2.9

Design principles for the Neighborly City

General principles	• Design considering human-scale and human-centric • Participation during the design process • Ensure the maintenance control
Neighborhood scale	• Good quality neighborhood (adequate, affordability, accessibility, public facility ,and utility) • Design housing that promotes social interaction between different groups of people (multi-generation living area) • Design concerning privacy, safety, and positive social interaction • Located public social space with facilities to give purpose to the space and enhance social activity • Create bumping places for people • Provide permeable facades • Provide pet and animal amenities • Invest third places that require no money to be spent and facilities • All features should be a concern with all age
City scale	• Ensure inclusive accessibility • Avoid architecture that may attract homelessly • Design walkable and bikeable cities (well-design pavement, traffic calming, street benches, public toilet, bicycle parking, shared transport service, good lighting, and signposting) • All for flexibility in the use of spaces • Design public space that includes physical infrastructure and social interaction facility • Create a flexible playful space to create social engagement • Provide safe shelters and access to facilities for homeless people

5) The Active City – Active living is a way of life that incorporates everyday physical activity. A city that is active can provide economic, safety, environmental, and social benefits.

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Table 2.10

The Active City Theory

Key concept of active city	• Active living • Active travel • Cognitive function • Brain health • Mixed-use development • Multi-modal street • Street connectivity
Theory of active city	• Impact of active space depends on place features, transportation infrastructure, workplace, and school. • 4 key pathways: Improved cognitive health, Improved mood via endorphin release, Improved sleep, and Increased exposure to a restorative environment.
Impact on mental health	• Active cities reduce depression, anxiety, and stress • Active cities improve the mental well-being of children and adolescents • Active cities reduce the risk and symptoms of dementia • Active cities support spatial cognition and wayfinding • Active cities improve social wellbeing
Modifiers of impact	• Engagement of people in the active cities • Perception of city • Social attitude and cultural norm
Design approaches for active city	• Accessibility and street connectivity • Safe routes • Mixed land use • Residential density • Parks and street trees • Urban design characteristics for all-age active cities (comfortable, accessibility for people with wheels, clearly visible, sheltered bus stop, public bathroom, public garden, local park, street trees and canopies, street aesthetic and architecture, independent mobility, all-age outdoor gyms, activity between old and young) • The psychological experience of active travel

The objective of the design principles of an active city is to create an urban environment that encourages physical activity by taking into account the

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economic differences of all individuals. The design will increase physical activity opportunities in the city.

Table 2.11

Design principles for the Active City

General principles	• The Global Street Design Guide (GSCI 2016) • The Center for Active Design's Civic Design Guidelines (2010) • Designed to Move Active Cities (2016) • Integrate 'active' into the everyday environment
Neighborhood scale	• **Open space and park** (pocket park with 5 minutes walking, a public park with 15 minutes walking, connect the park with multi-modal streets, street trees) • Mixed-use design (diverse mix facility within 20 minutes walk from a residential, mix of economically diverse housing in the community, connectivity between facility and street block, mixed-income multi-unit housing, parking lots with integrated public transit) • Street design (multi modes of transportation, good lighting and frequent seating, create a sense of place by design, pedestrian zones around attraction area, design connector, make navigation intuitive, limit garage walls facing the street, provide cut-through in cul-de-sacs for pedestrian connectivity) • Cycling infrastructure (clear signage, design cycle track that separated from pedestrian and vehicular traffic, provide cycling superhighways, bike rack on public transport, bicycle parking, bike-sharing, lighting on street, air pump facility) • Public transit (easy access, convenient, affordable, safe, comfortable) • School (locate school within walking distance, open up school recreation for public use) • **Active design in building** (ensure that building frontage open up to the public, design for entranceways, connect to the green corridor, connect to public transportation, subsidize public transit for vulnerable groups, encourage night event) • Use underutilized infrastructure (provide parklets and bike parking, use vacant lots for pop-up spaces, reclaim underutilized infrastructure) • Active living policy and promotion (provide information for active transit route, improve the condition of place to minimize crime)

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6) The Playable City – city planning that incorporates playful infrastructure. The term playable city is intended to be given precedence to child-friendly city, which prioritizes child-friendly urban design.

Table 2.12

The Playable City Theory

Key concept of playable city	• Play • Playful • Play affordance • Appropriative play • Pure-play context • Play-able context
Theory of playable city	• Impact of the playable city depends on child-orientated play and all-age play. • 5 key pathways: Child and adolescent development, Resilience to adverse life experiences, Curiosity and novelty seeking, Increased physical activity, and Increased exposure to restorative environments.
Impact on mental health	• Playable cities can help reduce depression and stress • Playable cities can improve brain function • Playable cities can reduce the risk of adverse childhood experiences and promote resilience
Modifiers of impact	• The possibilities of an environment offered for play • Culture's norms, rules, and laws • Parent perception of risk and dangers with different types of play
Design approaches for playable city	• Pure-play context (playground, play streets) • Play-able city context (interactive art, non-defined play context, urban digital game) • Playful infrastructure (playful rebellion, playful appropriation) • New play movements and playable technologies • Intergenerational play • The playable city

The playable city's design concepts strive to create an urban environment that facilitates playfulness activities for people of all ages. The design is predicated mostly on two factors: a pure-play context (design for play) and another playable context (design not for play but encourages playful activity).

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Table 2.13

Design principles for the Playable City

General principles	• The playable city should be approached to all-age
Neighborhood scale	• Design play facilities next to homes • Designed outdoor play facilities for all ages • Maximize informal nature play (pocket park, urban forest, vacant lots) • Design a playful space near a nature setting • Design labyrinths and mazes • Play streets • Explore urban digital gaming opportunities
City scale	• Install designated play facilities for all ages in the city park • Install playful art or interactive art • Develop an intergenerational play facility • Pop-up space for creativity • Maximize flexible use of structures to support activity • Open play and recreational facilities on the school ground

7) The Inclusive City – The concept of the inclusive city is to create a city that can be accessed and utilized by diverse user types, such as age, gender, race, and ethnicity, among others.

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Table 2.14

The Inclusive City Theory

Key concept of inclusive city	• Universal and inclusive design • Minority stress theory • Residential or spatial segregation • Residential or spatial collocation • Gender mainstreaming
Theory of inclusive city	• Impact of an inclusive city depends on inclusive design features and the setting that can create inclusive belonging, equity, and justice. • 3 key pathways: Equitable access to a restorative environment, Unequal exposure to harmful settings, Stigma of exclusion.
Impact on mental health	• Spatial segregation • The rise of spatial segregation in neighborhood • Segregation within shared spaces • Segregation also has potentially positive impacts on mental health • Design for baseline • Different needs for infrastructure and facilities
Modifiers of impact	• Personal characteristics
Design approaches for inclusive city	• Reducing the negative impacts of spatial segregation • Moving the design to meet the needs of a baseline population to design that meets the needs of diverse city users (walkability to all, transit for all, safety for all, comfort for all, visibility for all, mixed-income/age residential development, homeless person-inclusive design) • Community engagement for inclusive planning and design at every stage

The inclusive city's design concepts strive to provide an urban environment with accessible amenities and services. To create an environment conducive to mental health and well-being, the design will take into account varied types of populations and economic disparities.

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Table 2.15

Design principles for the Inclusive City

General principles	• Engage with community user
Neighborhood scale	• Plan mixed-use neighborhood • Accessible pedestrian infrastructures • Design potential subdivisions of the park and other public spaces for diverse groups of user • Enhance wayfinding for safety • Reduce crime vulnerability by ensuring natural surveillance • Avoid stigmatizing a different group
City scale	• Mandate inclusive design and development • Ensure connectivity for all neighborhood • Provide access to public toilets for all genders • Provide accessible public transport • Walking trails to connect neighborhood

Reflection – the study of *The Restorative City* identifies particular urban factors that can affect mental health and wellness. This method's approach incorporates not only broad principles (physical aspect, social aspect, and economic aspect), but also people's feelings and emotions in order to create the most conducive atmosphere that can positively influence mental health. This theory is also one of the urban design guidelines that focuses mostly on mental health conditions.

Comparison of advantages and disadvantages is used for critical reflection in order to determine the significance of each mental health-related theory. The advantage of *Urban Design and Mental Health* is that it focuses on the urban physical features that can affect improved mental health, however the disadvantage is that it does not take into account the social conditions and social difficulties of the urban population. The advantage of the *Urban Sanity* theory is that it focuses on urban environmental difficulties that can impact negative elements of mental states, but the theory's downside is that it lacks a physical solution to create better environmental conditions. *The restorative city* focuses on urban characteristics or the conceptual city that can have a positive effect on mental health, but the theory does not account for the real urban setting and state.

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Figure 2.6 The advantage and disadvantage of Mental Health-related theory

2.2 Applying the Mental Health-related Theory to Case Study Analysis to Review on Environmental Factors that Influence Mental Health

This thesis discusses two case studies, Hong Kong and Tokyo, to review the case studies of the environmental elements that influence a healthy mental condition. Hong Kong and Tokyo were chosen because they have metropolitan similarities with Bangkok, such as being highly developed and located in the Central Business District. This sector will concentrate on the research of urban characteristics and the influence of physical circumstances on mental health using mental health-related theory approaches.

2.2.1 Hong Kong

Hong Kong is a special administrative area of China located in South China's Pearl River Delta (Zhujiang River). Hong Kong has a current population of 7.5 million people (December 2021). Hong Kong is a dense and advanced metropolis. The city features an abundance of skyscrapers and high-rise buildings. Hong Kong's high skyscraper density and uneven topography have a negative impact on the mental health of its residents.

1) Mental Health in Hong Kong - Hong Kong's mental health overall, [Hong Kong Public Opinion Research Institute (HKPOI), 2019]. More than 61% of the

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Hong Kong population suffers from low mental health and wellbeing. From 2015 to 2019, the average of the World Health Organization Well-being Index (WHO-5) used in the survey continues to decrease, which also shows an increase in the prevalence of mental illness. [Hong Kong Mental Morbidity Survey (HKMMS), 2015] Mixed anxiety and depression (13.3%) is the most prevalent mental disorder among Hong Kong's Chinese adults.

2) Urban Density and Mental Health – with more over 7.5 million people living on 1,050 square kilometers of land, the population density per square kilometer is 7,222. (December 2021). Hong Kong is a metropolis with extensive underground and high-rise construction.

3) Housing and Mental Health – Hong Kong's property market is the most expensive in the world. The majority of Hong Kong's population lives in modest apartments within tall towers. Housing development in Hong Kong is hampered by high housing costs and limited living space, as well as a large population. Some are also known as Cage Homes, which refers to an apartment with numerous small living spaces. People who cannot afford a larger living area may be required to reside in this type of apartment, which focuses heavily on mental health. Living conditions in Hong Kong's tower buildings are deplorable, contributing to a high number of suicides and drug overdoses.



Figure 2.7 The housing development in Hong Kong, Quarry Bay

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4) Green Space in Hong Kong – 40% of the land area is comprised of green space, which is less than 3 square meters per person (China mainland 10 square meters per person). [Hong Kong Planning Department, 2017] Formal parks and gardens make up 46% of Hong Kong's public green space, followed by open space in public housing estates (36%), private residential and organization space (15%), and beaches (3%). 56% of Hong Kong residents were disappointed with the quality of the city's parks and green areas, according to a survey (Degolyer, 2016). The primary issues of urban green space in Hong Kong are the quality and usability of the space, as the majority of Hong Kong's public parks are paved and of a very small size. The second difficulty of green space is public space norms and regulations. Hong Kong's public green space is governed by an abundance of restrictions due to the government's lack of maintenance. Due to these obstacles, the majority of Hong Kong's public green spaces are of poor quality and inaccessible. The motivations to create green space in Hong Kong are economically motivated, to have green space that can increase the value of the land lease, such as giving public open space with greenery in the business district. GFA bonus is the advantage of providing public green space (gross floor area)

5) Physical Activity Space in Hong Kong – The majority of Hong Kong's physical activity space is dedicated to facilitating urban mobility. Even at night, the city center of Hong Kong is densely populated with individuals. People may walk and ride bicycles at night without worry. The physical activity space in Hong Kong includes public transportation, walking, and cycling, among other activities.

6) Public Transport - Hong Kong is a city of public transport. More than 41% of the city's population lives within walking distance of a public train station, which can promote walkability for public transit. A well-designed public transit system in Hong Kong allows individuals to reach their destination within 200 meters. Hong Kong may not be well-designed for being a walkable metropolis, yet the condition of the city encourages people to stroll. The city roadway features poor circumstances for pedestrians, including a limited pedestrian route, discontinuous paths, and strong car-oriented traffic. Due to safety concerns, poor air quality, and short riding lanes, Hong

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Kong has a small population of cyclists and bicyclists. Moreover, the majority of the space for physical activity is private.

7) Social Activity in Hong Kong – Hong Kong's urban characteristics can aid in fostering social connection chances, however the city's climate for outdoor interaction spaces and tiny living quarters limits these options. The environment for social interaction may comprise both indoor and outdoor areas. The majority of Hong Kong's indoor social interaction space is located within retail malls. For outdoor social interaction space, the Sitting-out area is furnished with benches intended to promote social contact and physical activity.



Figure 2.8 Sitting-Out space in Hong Kong, Hill Road

8) Noise and Light – Hong Kong is a bustling metropolis with abundant nighttime illumination. Incorporate noise-reducing design aspects into design guidelines.

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Table 2.16

Urban characteristics of Hong Kong in Urban Design and Mental Health

Urban Design and Mental health	Urban characteristics in Hong Kong	Advantage (+)	Disadvantage (-)
Green space and access to nature	• Green space is less than 3 square meters per person (green space in WHO suggestion is a minimum of 9 square meters per person) • Park and garden (46%) • Open space in a public housing estate (36%) • Private residential and organization (15%) • Benches (3%)	• Financially driven (GFA bonus for incentives of providing green features) • Land value-added • Green-blue infrastructure in the city	• Lacks green space • Most public park is small • Most public park is low quality and inaccessible • Abundance of rules • Limitation of space
Active space for exercise	• Transportation system and pedestrian network • Public park and recreational space • Sports facility	• Public transportation system designed to encourage walkability in the city • Over 41% of residents living within walkable distance from public transportation	• Not well-design for walkability and pedestrian • Limitation of space • Lacks maintanence • Inflexible facility and private sports facility
Pro-social places to encourage positive social interaction	• Indoor social interaction space (commercial area, office lobbies, etc.) • Outdoor social interaction space • Public space in the residential unit	• Sitting out space for socializing and resting • Design guidelines for social interaction space in the residential area	• Limitation of climate for outdoor interaction space • Lacks public indoor social interaction space • Limitation of space
Safety in the city	• Active city (24 hours active) • Diverse population • Rules and regulations (crime and accident)	• Eyes monitoring from all-time activity • Low crime rate	• Women traveling alone can be dangerous • Narrow street and crowded • Dark and blind spots area
Sleep	• Active city • Noisy city • Bright city	• Building Ordinance guidelines including noise-reducing design (incentives features)	• Noise and light pollution affect sleep condition
Transportation and connection	• Public transport-oriented city • Various choices of public transportation (railways, tramways, funicular railways, trains, buses, public light buses, taxis, ferries, cable cars) • Only 8% of people own a car • Payment system	• Well-design public transport system • Over 41% of residents living within walkable distance from public transportation • Alternative payment system	• Residential areas that are not within walkable distance from public transportation • High number of user • High density of traffic on the ground
Economic stress and affordability in the city	• High-density population • High-density residential in the city • High living expenses in the city • High land price residential • High competitive city	• Affordable housing in the city center area	• Lacks affordable housing • High-density of population • Low-quality housing • Unsafety environment • High-cost and small living space
Air pollution	• Contribute by motors vehicles, marine vessels, and power plants • Diesel vehicles (car, bus, truck) • High traffic congestion • Public transport-oriented city	• Car ownership is low • Well-design public transport system • Clean Air Plan 2035	• Diesel vehicles • High density of traffic • Private car is popular in the newly developed area

The study of *Urban Design and Mental health* can reveal the physical characteristics of Hong Kong, which can expose that Hong Kong is lacking in quantity and quality of green space, a well-designed public transportation system, good pedestrian connectivity but poor physical condition, the provision of Sitting-Out

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space and creative public space to promote social interaction, a 24-hour active city, a noisy and bright city, high economic stress, and high pollution.

Table 2.17

Urban characteristics of Hong Kong in Urban Sanity

Urban Sanity	Urban characteristics in Hong Kong	Advantage (+)	Disadvantage (-)
Concentrated mental illness risk	• 61% of the population facing mental illness issues • Group of people who facing problems (financial, emotional, familial, and health problems) • Social inequality • Homeless and poverty • Super-aging society • Health services and facilities in the city	• Health services and facilities in the city	• High number of mixed anxiety and depression • High-stress level • Mental health is not the priority for developing city • Lacks support facility for vulnerable groups • Financial problems
Alcohol and drug abuse	• Strict laws and regulations • Number of drug abuse is declining • Hidden drug abuse (under investigation) • Addiction treatment center in the city	• Low number of drug and alcohol abuse • Strict laws and regulations • Addiction treatment center • The Narcotics Division (NGO) has a drug rehabilitation service for voluntary people	• Alcohol and drug abuse can be a negative effect on health and wellbeing • Hidden drug abuse • Financial problems on treatment
Social isolation and loneliness	• High number of elder people in Hong Kong live alone and do not get enough social interaction • High number of migration people	• Some people with social isolation and privacy can be a positive benefit on mental condition (introvert) • Avoid crowded and busy environment	• Social isolate and loneliness can lead to mental illness, depression, and stress
Noise and light pollution	• Noisy city • Bright city	• Active city (physical, social, and economic active)	• Noise and light pollution affect well-being and sleep
Toxic pollution	• Air pollution is a major issue in Hong Kong • Contribute by motors vehicles, marine vessels, and power plants	• Clean Air Plan 2035	• Toxic pollution has a negative effect on health and wellbeing
Excessive stimulation stress	• High-stress level • High competitiveness city • Crowded and busy environment • Social isolation • Well-being score is under average (2021)		• High competitiveness city for business and economy lead to high stress in the working environment
Crime	• Low violent crime • Personal attack is rare	• Low crime rate • Eyes monitoring for safety	• Women traveling alone can be dangerous
Crowding and reducing privacy	• 7.5 million population in Hong Kong • 7,222 people per square kilometers • High-density population	• Encourage social interaction • Active city (physical, social, and economic active)	• High-density populated area • Less privacy
Physical activity and fitness	• Well-design transit system and pedestrian network • Public park and recreational space • Sports facility	• Public infrastructure to encourage walkability	• Inflexible facility and private sports facility • Lacks maintanence • Bad quality of public utility
Economic stress	• High living expenses in the city • High land and housing price • High competitiveness in the working environment	• Affordable housing in the city center area • Job oppourtunity	• High living cost • Small living space • High-stress levels in the working environment
Transport condition	• Public transport-oriented city (various choices) • Only 8% of people own a car	• Public transportation system encourage walkability	• High number of user • Traffic congestion
Inadequate interaction with nature	• Green space is less than 3 square meters per person • Lacks green space • Low quality and inaccessible public park	• Land value-added	• Small space • Bad management • Abundance of rules

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The study of *Urban Sanity* indicates that Hong Kong city has a high number of people with mental issues, social inequality, a financial crisis that caused high stress and depression, a low number of drug-alcohol addiction and well-supported treatment services, a high number of socially isolated in the elderly, a noisy and bright city, high toxic pollution, high excessive stimulation stress, low crime rate, a high-density populated area, high physical activity, and well-designed transportation systems.

Table 2.18

Urban characteristics of Hong Kong in The Restorative City

The Restorative City	Urban Characteristic in Hong Kong	Matching characteristic
The Green City	• Green space in Hong Kong is less than 3 square meters per person • Low quality and inaccessible green space • Park and garden (46%) • Open space in a public housing estate (36%) • Private residential and organization (15%) • Benches (3%) • Lacks maintenance and management system	
The Blue City	• Hong Kong is a coastal city surrounded by water and aquatic environment • Hong Kong coastal trail design to encourage interaction with nature • Water-related activity and business • Biodiversity of the marine environment • Park and recreation spaces that integrate with water resource • Inland waterways	O
The Sensory City	• Noisy city (no public design for reducing noise pollution) • Bright city (no public design for reducing light pollution) • High traffic volume and congestion lead to the air pollution issue • No sensory related-design	
The Neighborly City	• The architecture design guideline includes open space in the neighborhood area • Public interaction area (Sitting-out space) • Lacks multi-generation interaction activity and space • The environmental design in the neighborhood does not encourage social interaction and activity • Low-quality of public housing with high-density residents • High housing prices with small space	
The Active City	• High-density area (city development and population) • Mixed land use • 24 hours active city • Good public facility accessibility • Well-connectivity to public transportation • Well-design to encourage walkability and public interaction • Eyes monitoring for safety	O
The Playable City	• Existing landmarks and attraction spots • Public monuments, interactive art, and public nodes • Playground and street design for social interaction • Creative architecture and city design • Pop-up space for creativity	O
The Inclusive City	• The architecture design guideline include universal design • Lacks inclusive facilities and low quality • The city focus to provide an inclusive design in the area with a high density of older people • Providing an inclusive design in newly development area	

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The study of *The Restorative City* can demonstrate that Hong Kong's features are comparable to those of The Blue City, The Active City, and The Playable City. And lacking the qualities of The Green City, The Sensory City, The Neighborly City, or The Inclusive City.

Reflection – Hong Kong is one of the busiest cities in the world, with long working hours and an abundance of urban expansion, all of which contribute to poor mental health. Due to the limited space available for the development of public space, the city prioritizes projects that create financial profit over those that promote social interaction. The city lacks public space and a place for social gathering. The quality of a city that can foster excellent mental health is not its physical condition, but rather a shift in its behavior, such as having a city with good public transportation and traffic volume that encourages walking. To improve mental health in the city, the city should be built in a public space, natural setting, with a safe environment, and inclusive design.

2.2.2 Tokyo

Tokyo, the capital city of Japan, is located to the northwest of Tokyo Bay in the Kanto region on the Pacific coast's central arc. Tokyo's current population stands at 14.04 million (2021). Tokyo is the hub of the city's political economy. The urban planning of Tokyo is characterized by a cycle of destruction and repair of the city, including reconstruction to produce fireproofing during the Meiji period, reconstruction after the Great Kanto Earthquake in 1923, and reconstruction after the city was damaged in World War II. The city continues to grow, and Tokyo remains the economic epicenter.

1) Mental Health in Tokyo – there is a lack of understanding of mental health in Japan. People in Japan are frequently included in mental health in mental problems, leading to complications in the promotion of mental health. The World Mental Health Organization has surveyed 4,000 individuals in Japan regarding their mental health. The result indicates that the Japanese have an 8.1% risk of anxiety disorder, a 7.4% risk of alcohol-related drug abuse disorder, and a 6.6% risk of depression. Men are more likely to have a mental condition. Long working hours in

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Tokyo contribute to high levels of stress, health problems, stroke, and suicide. Japan has the seventh-highest suicide rate in the world (OECD, 2017). Suicide might be caused by unemployment, financial difficulties, and familial issues. Furthermore, living in a country with a high risk of natural disasters might lead to mental health issues.

2) Urban Density and Mental Health – with more than 14,04 million people living on 2,194 square kilometers of land, the population density per square kilometer is 6,400. (2021). Tokyo is one of the world's busiest and most active cities.

3) Access to Nature: Blue and Green Infrastructure - the health advantages of green space have been established in Japan. The design of access to green space has been included into the cityscape of Tokyo, such as the landscape design along pedestrian walkways that encourages socialization and relaxation. To increase Tokyo's residents' access to nature, numerous programs and incentives support the construction of green space. For instance, Tokyo's Comprehensive Policy for Preserving Greenery (2010) is a green space preservation statute in particular Tokyo zones.



Figure 2.9 Integrating green space to urban elements, Shiodome neighborhood

4) Machizukuri (Citizen Participatory for Community Design) – using Machizukuri enables community members to engage in the planning phase of community development. The outcome of the development would be user satisfaction and a higher quality of life.

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5) Active Space – Tokyo is not a car-dependent metropolis, as the majority of commuters utilize public transportation. The average Tokyoite incorporates light movement such as walking, cycling, and public transportation into their daily routines. Tokyo's physical design encourages walking and cycling by incorporating a pedestrian-friendly environment, in accordance with The Guideline to Promote Town Planning of Health, Medical Care and Welfare-Technical Advice from Japan's Ministry of Land, Infrastructure, Transport, and Tourism. The recommendations emphasize the significance of a path's perspective, resting areas, safety, and a design that encourages walking and exercise. For public transportation, the inclusion of efficiency, dependability, affordability, and dependability in Tokyo's public transportation contributes to the success of the country's constructed public transportation system.

6) Social Interaction Space – due to the limited area in Japan, Tokyo's public space prioritizes social interaction spaces that attract people for socializing. In Tokyo, there are a public park, a plaza near the railway station, temples, and shrines that serve as outdoor recreation space. For public indoor spaces such as retail malls, restaurants, and offices. By having an aging population, Tokyo prioritizes the elderly. The planning and development of the city consider the mobility and socialization of senior citizens.

7) Safe Space – Tokyo has prioritized the safety of its inhabitants in the face of both criminal activity and natural calamities. Tokyo's safety city design intervention includes earthquake-resistant structures, firebreak strips, and barrier-free design[17]. In accordance with Episode 4 of the Tokyo City Planning Vision, the city is also enhancing the quality of life for the elderly and the disabled.

[17] Barrier-free design is an approach to construction that takes into consideration the needs of those with a disability. Barrier-free design elements are features like wooden or metal ramps leading to the exterior doors, widened hallways that can accommodate wheelchairs, lower counter tops for ease of access, and the removal of shelves under sinks for wheelchair access.

Table 2.19

Urban characteristics of Tokyo in Urban Design and Mental Health

Urban Design and Mental health	Urban characteristics in Tokyo	Advantage (+)	Disadvantage (-)
Green space and access to nature	• Greenery environment • Good accessible to green space • Good adaptation to public elements • Public park and recreation space • Distance from public parks and neighborhood is long	• Recognizing green space as a health benefit • Many policies and incensive encourage the development of green space	• Strict rules and regulation • Inflexible space and activity • Limitation of space
Active space for exercise	• Not car-dependent city • Commute by public transport, walking, and cycling • Pedestrian-friendly for walking and bike	• Prioritize pedestrian and cyclist • The guideline design encourages walkability and bikeability	• Strict rules and regulation • Inflexible space and activity • Lacks cycling infrastructure
Pro-social places to encourage positive social interaction	• Limited space in Japan • Indoor social interaction space (shopping mall, restaurant, office) • Outdoor social interaction space (public park, plaza at transit station, temples, shrines) • Citizens in the community can participate in local development (Machizukuri)	• Various places to encourage social interaction • Citizens can participate in community design	• Strict rules and regulation • Lacks social public space (limited space) • High number of social issues
Safety in the city	• Prioritizing safety in both crime and natural disaster • High number of senior driver lead to a higher risk of accident • Design public facilities and utilities that concern on elder and disabilities	• One of the safest cities in the world • Design intervention for natural disaster • Design to improve the living quality of the elder and disabilities	• With the high number of senior driver lead to a high risk of accident • High number of natural disaster
Sleep	• Many people face social issues on a lack of sleep • No good environment for sleep	• Active city (physical, social, and economic active)	• Tried and depression • Busy and active city
Transportation and connection	• Public transport-dependent city • Accessible to public transport • Seamless city (mass transportation and feeder)	• Well-design and management of public transportation system	• Strict rules and regulation • With the limitation of space, the design of public transit is complex and leads to getting lost
Economic stress and affordability in the city	• High living expense • High economic stress • High stress in studying and working environment • High competitive environment	• Affordable price • Affordable housing in the city	• Environment-related economic lead to higher stress levels • Expensive housing price with small space
Air pollution	• Good quality of air condition • Contribute by motors vehicles and factory	• Well-management and control of air quality	• Air pollution is still contribute by vehicles and factory

The study of *Urban Design and Mental health* can identify the physical characteristics of Tokyo, revealing that the city has good access to and high-quality public green space, a well-designed mass transit and feeder system, good pedestrian connectivity that encourages walkability and bike-ability, good community relationships but a lack of public interaction space, the safest city, an active, noisy, and bright city, high economic stress, and low pollution.

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Table 2.20

Urban characteristics of Tokyo in Urban Sanity

Urban Sanity	Urban characteristics in Tokyo	Advantage (+)	Disadvantage (-)
Concentrated mental illness risk	• Mental health is not being recognized as a health issue but the synonymous with mental illness • Super-aged society • Homeless • Social pressure • High suicide rate	• Considering the design for senior living quality	• Ageing society • Mental health is not being recognized and aware well enough in the society
Alcohol and drug abuse	• Drinking alcohol in Japan is part of their cultures • Business life requires drinking (nomunication – to drink and communication) • Heavy drinking is a social norm • Lead to the problems of alcohol use disorders • Illegal drug use in Japan was influenced by the economy and war (highly drug use and overdose) • Drug use is decreasing	• Social interaction and activity • Reduce stress and feeling pressure from the social environment	• Alcohol drinking leads to family problems, violence, mental illness, and physical illness • Drug use is illegal and the harshest punishment • Addiction and overdose • Leads to mental illness
Social isolate and loneliness	• High number of individuals living in Japan (Hikikomori) • More than 700,000 individuals living (average age of 31) • Spending most time alone at home • Social withdrawal	• Avoid feeling pressure from the social environment that leads to mental issues	• Individuals living lead to unhappiness, lack of social interaction, become insecure, shy, and talk less
Noise and light pollution	• Active and busy city • Noise and light pollution affect the quality of sleep	• Active city (physical, social, and economic active)	• Affect quality of sleep
Toxic pollution	• Good quality of air condition • Contribute by motors vehicles and factory	• Well-management and control of air quality	• Toxic pollution harms on health and wellbeing
Excessive stimulation stress	• High social pressure in education, working environment, and family factor • High competitive environment of studying and working leads to high stress and depression • Social pressure leads to social withdrawal (Hikikomori)	• Highly developing in business and education • Successful business • High quality educational	• High number of mental health issues • Stress and depression • Social pressure leads to suicide
Crime	• Low crime rate • Safest countries in the world	• Low crime rate • Eyes monitoring for safety	• Culture of Gangster
Crowding and reduce privacy	• Active and busy city • 14.04 million population in Tokyo • 6,400 people per square kilometers • High-density populated area	• Encourage social interaction • Active city (physical, social, and economic active)	• High-density populated area • Less privacy
Physical activity and fitness	• Pedestrian-friendly design for walk and bike • Transit-Oriented Development encourage walking rather than a private car using • Sports facility and complex	• The public utilities enhance walking and cycling in the daily routine	• Strict rules and regulation • Inflexible space and activity • Private sports complex
Economic stress	• High living expense • High competitive in the working environment	• Good public recognize and support stress reduction	• Stress and depression • Overworking
Transport condition	• Well-design and management of public transportation system • Easy access to public transportation • Seamless city (mass transportation and feeder) • Including universal and inclusive design of facilities	• On-time (time management) • Accessible to all area • Various choices of transportation	• High density of users in rushing hour • Lead to accident • The design of public transit is the complexity
Inadequate interaction with nature	• Greenery environment • Good accessible to green space • Good adaptation to public elements	• Easy to access green space and nature	• Strict rules and regulation • Inflexible space and activity • Limitation of space

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The study of *Urban Sanity* indicates that Tokyo has a high number of people with mental illness, a high suicide rate caused by social pressure (on the educational environment, working environment, and family and cultural factors), a heavy drinking culture and a high number of drug users, a high number of socially isolated individuals, a noisy and bright city that affects the quality of sleep, low levels of toxic pollution, high levels of excessive stimulation stress, a low crime rate, and a high population density.

Table 2.21

Urban characteristics of Tokyo in The Restorative City

The Restorative City	Urban Characteristic in Tokyo	Matching characteristic
The Green City	• Greenery environment • Good accessible to green space • Good adaptation to public elements • Public park and recreation space • High-quality maintenance on green space • Many policies and incensive encourage the development of green space	O
The Blue City	• Coastal city and bay • Well-design waterworks system • Accessible to water resource • Flood protection system • Storms and tsunamis control and management system	
The Sensory City	• Noisy city (no public design for reducing noise pollution) • Bright city (no public design for reducing light pollution) • No sensory related-design • Well-management and control of air quality	
The Neighborly City	• Citizens can participate in community design (Machizukuri) • Various choices of rental housing with different rates of pricing • Public space in the neighborhood area • Accessible to mixed-use and commercial • Accessible to local feeder	
The Active City	• High-density area (city development and population) • Mixed land use • 24 hours active city • Good public facility accessibility • Well-design park and green elements • Well-connectivity to public transportation • Well-design to encourage walkability and public interaction • Eyes monitoring for safety	O
The Playable City	• Existing landmarks and attraction spots • Public monuments, interactive art, and public nodes • Playground and street design for social interaction	
The Inclusive City	• The architecture design guideline include universal design • With being a super-aging city, Tokyo's public facilities and utilities is including universal and inclusive design for all people • good quality of public facilities and utilities	O

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The study of *The Restorative City* can demonstrate that Tokyo's qualities align with those of The Green City, The Active City, and The Inclusive City. And lacking the qualities of The Blue City, The Sensory City, The Neighborly City, or The Playable City

Reflection – Due to the long working hours, overtime culture, and urbanization, Tokyo is a city with a high incidence of mental illness. Lack of mental health support services results from a muddled concept of mental health. However, Japan's high standard of life can aid improve mental health and serve as a mental health support facility. Excellent public transportation, a city that is walkable and bikeable, the incorporation of green space with urban components, the concept of community participation, and a participatory culture are characteristics of a city that can positively influence mental health.

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2.3 Finding the Relationship and Similarity of Mental Health-related Theory

In order to develop the new environmental design guideline for mental health, the existing mental health-related theories would be taken into account. This section of the thesis investigates the relationship and resemblance between each theory pertaining to mental health.

Through their characteristics and propositions, the following theories described in this thesis can be connected. *The Restorative City* is an urban idea and set of features that can influence a person's mental health. *Urban Sanity* refers to the urban challenges and problems that urban characteristics can generate. And *Urban Design and Mental Health* as urban components that are designed to help mental health.



Figure 2.10 Mental Health-related Theory relationship diagram

By recognizing the connection between theories, they can be related to one another. For instance, the urban qualities of the green city and blue city can be linked to the urban problem of insufficient engagement with environment, which can be resolved by incorporating green space into physical urban aspects.

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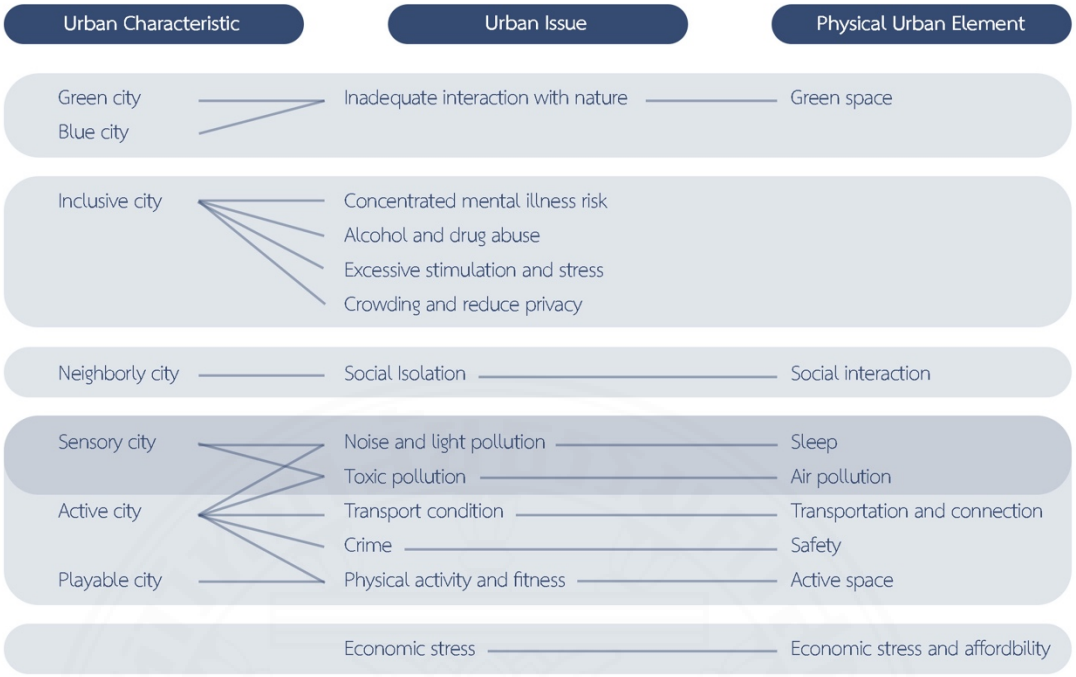


Figure 2.11 Grouping the similarity of the Mental Health-related theory

2.4 The Consideration of Behavior Changing on Post-pandemic Situation

Coronavirus disease 2019 or COVID-19 is a global pandemic that continues to influence human behavior owing to the severe circumstances that prompted individuals to stay at home and engage in social isolation to prevent the virus's spread. Changes in lifestyle brought on by a pandemic can affect a variety of factors, including social, health, tourist, and technological issues, among others.

1) Healthy Lifestyle – people tend to be more focused on a healthy lifestyle concerning food and exercise

- Reducing the meals eaten outside and purchasing food delivery
- Cooking and eating at home during the pandemic
- Paying more attention to health
- Encourage exercise for healthy

2) Natural Environment – access to a natural environment that has good ventilation can support both physical and mental health

- Planting tree

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3) Avoid Human Contact – design environment that reduces density and use technology to avoid physical contact (cashless)

- Reducing social activity, social distancing, and avoid human contact
- Avoiding a trip to shopping malls and shopping by online platform
- Using online platform for working
- Strict guidelines for sport facility
- Reducing long-distance traveling
- Promote domestic traveling
- Using technology for reducing human touch
- Cashless society
- Reducing social gathering and holding the gathering in private space
- Reducing the meeting
- Indoor activity

4) Technology – technology and online platform is used (virtual meeting, food delivery, online shopping)

- Technology and automatic development
- Virtual and online platform
- Increasing of technology and online platform

Reflection – after a pandemic, people's lifestyles may not be as stringent as they were during the outbreak, but they may change. Social contact would be a worry; as a result, people may minimize opportunities for human touch and develop technologies that eliminate the need for everyday human contact, such as mobile banking systems. The internet platform will be expanded in order to improve the quality of life. In the future, health and mental health will be of more significance, and people will place greater emphasis on improving their physical and mental health. And urban development that enhances the quality of life will be accelerated.

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CHAPTER 3
RESEARCH METHODOLOGY

According to the study framework (Chapter 1.6), the research technique comprises the mythology of the new guideline development, data collecting, and data analysis. The two methods of data collection are primary research and secondary research. Data analysis technique integrates analysis via the new mental health environmental guideline and SWOT analysis.



Figure 3.1 Research methodology framework

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3.1 New Environmental Design Guideline for Mental Health

The conceptual development of the new environmental design guideline for mental health is based on three primary factors that influence the quality of urban elements in order to minimize stress and improve mental health. Physical design for a better environment (Access), physical design for stimulating social engagement and interaction (Active), and physical design for lowering economic stress (Afford) should be the leading development strategies. These three tactics will serve as our concept and guiding principles for developing an urban environment that improves the mental health of the urban people.

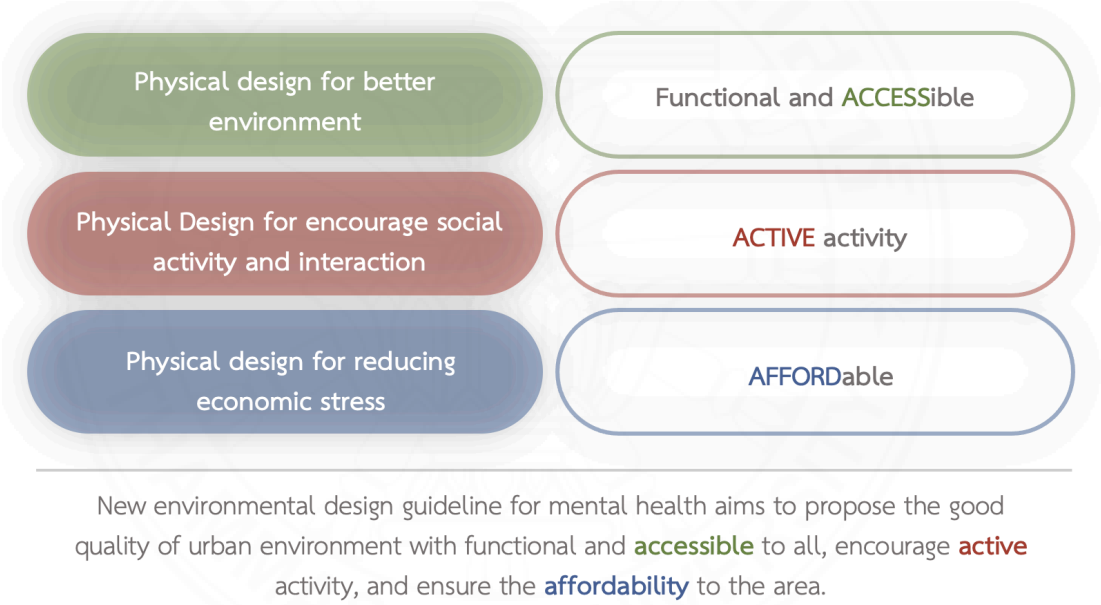


Figure 3.2 The conceptual diagram of the new environmental design for Mental Health

1) Access and Functional – to create a physical urban element for a better environment, the urban element must be of high quality and easily accessible. For an urban element to be of high quality, it must be in good condition and functional to the needs of the area's users. Moreover, the urban design aspect should be accessible to everyone without exception.

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2) Active – to build an urban physical feature to foster social activity and human connection, the design must be functional and responsive to the needs of the area's inhabitants.

3) Afford – to reduce economic stress through the design of an urban physical feature, the urban environment should address financial affordability.

Development Process of the New Environmental Design Guideline

The development method for the new environmental design guideline for mental health consists of three key steps: identifying types of development, grouping development topics, and establishing development criteria for the new environmental design guideline.

Step 1: Identifying types of development

Following the literature and case study review (Chapter 2), This thesis discusses three theories related to mental health. *Urban Design and Mental Health*, *Urban Sanity*, and *The Restorative City* are the theories that explain the urban mechanisms that influence the mental health of the urban population. These urban mechanisms can be easily divided into three different sorts of aspects: environmental, social, and economic. The environmental element includes urban mechanisms that are directly related to the physical environment, such as green space, active space, safety, pollution, and transit, among others. The social aspect includes the urban mechanism associated with the city's social state. In addition, the economic side includes financial pressure.

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Figure 3.3 Urban mechanism of environmental aspect

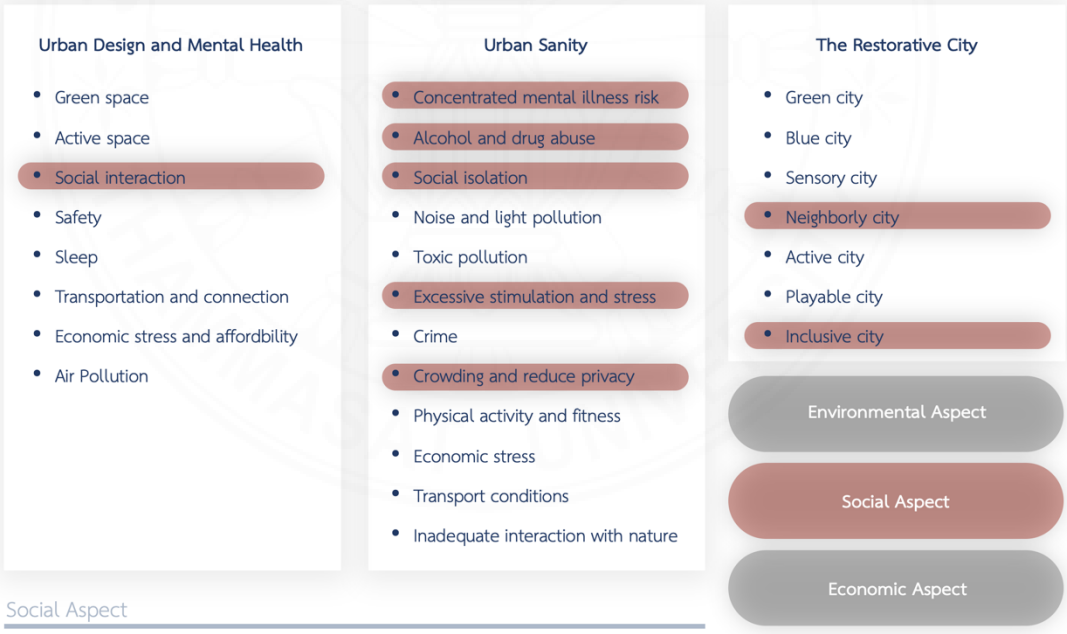


Figure 3.4 Urban mechanism of social aspect

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Figure 3.5 Urban mechanism of economic aspects

Step 2: Group the focusing topic

By determining the relationship and grouping the similarity of mental health-related theories in Chapter 2.3, the urban mechanisms in these three theories may be classified into nine subtopics. The environmental aspect consists of six subtopics. The social aspect is separated into two subtopics and an economic aspect.

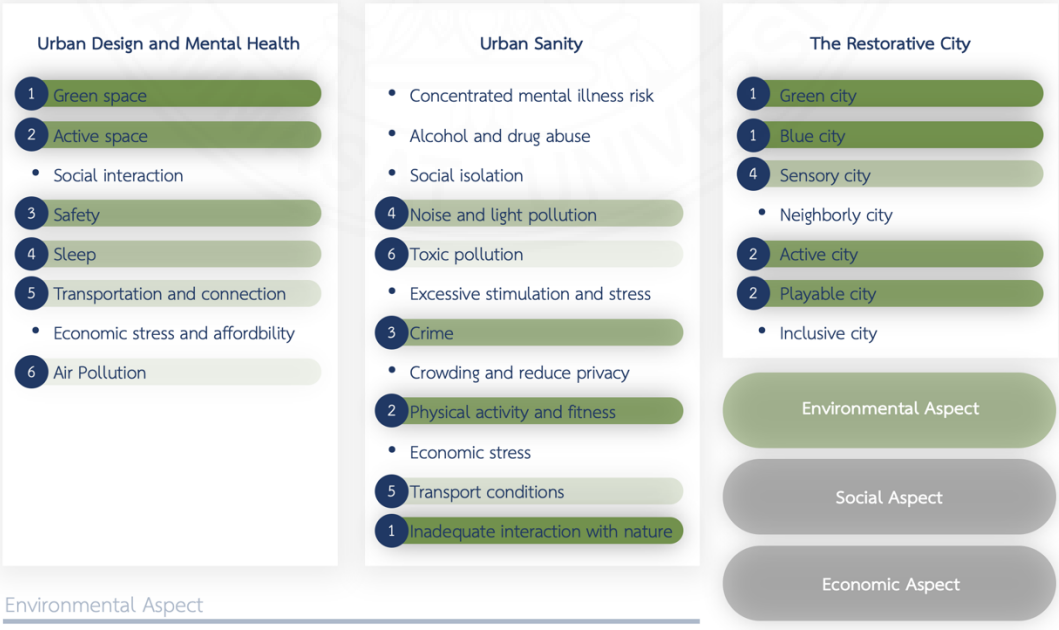


Figure 3.6 Environmental aspect sub-topics

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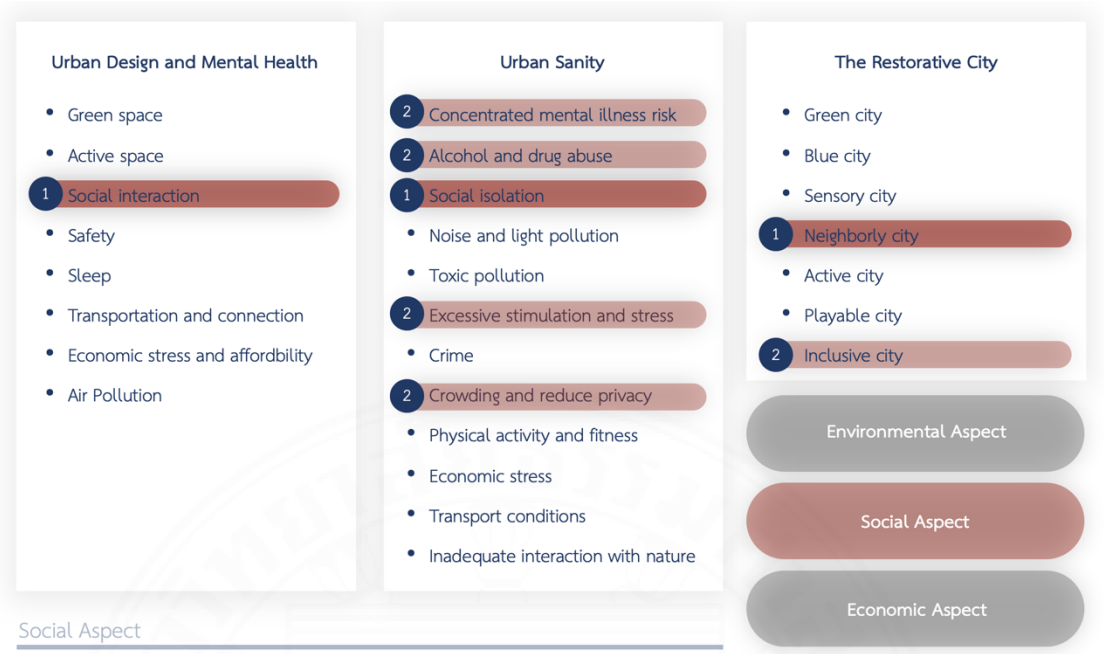


Figure 3.7 Social aspect sub-topics



Figure 3.8 Economic aspect sub-topics

Step 3: Create criteria for new guideline development

Creating the development criteria for each area of the new environmental design guideline for mental health by considering the post-pandemic situation into account (Chapter 2.4)

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New Guideline Development for Environmental Aspect

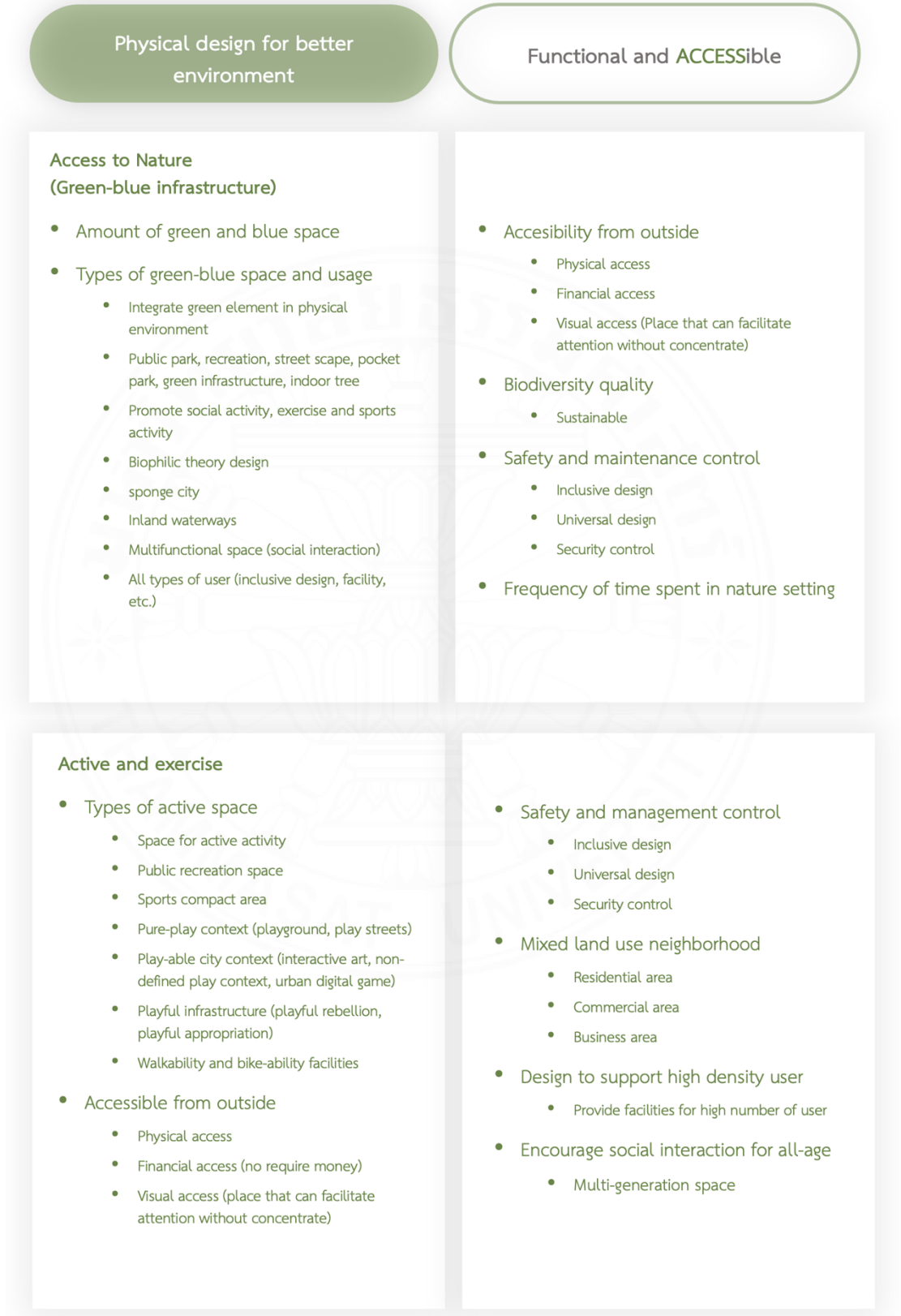


Figure 3.9 Development criteria for environmental aspect

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Figure 3.9 Development criteria for environmental aspect (Cont.)

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Figure 3.9 Development criteria for environmental aspect (Cont.)

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New Guideline Development for Social Aspect



Figure 3.10 Development criteria for social aspect

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New Guideline Development for Economic Aspect

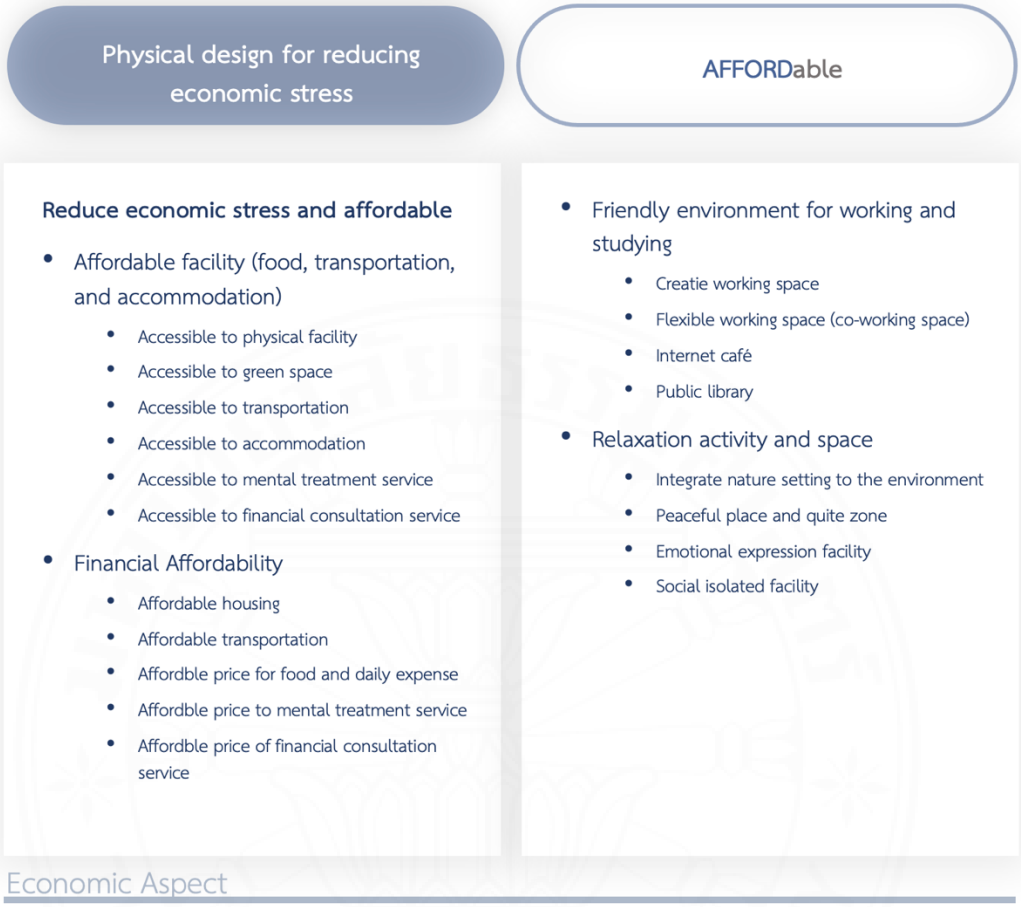


Figure 3.11 Development criteria for economic aspect

3.2 Data Collection Methods

The methods of data collection include both primary and secondary data collection. Primary data collection for this thesis consists of actual site observation, with secondary data collection consisting of information gathered from credible data resources and case studies of best practices.

3.2.1 Site Observation

Observation of the site is utilized to examine the physical and socioeconomic parameters of the site chosen. The outcome of the site observation is represented through mapping and graphics.

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3.2.2 Secondary Research

Collecting accurate data from a variety of sources, both online and offline, to collect accurate data on-site information, urban components in the area, the status of the area, and project development. This information is utilized to determine the area's status prior to planning its specific development.

3.3 Data Analysis Methods

In this thesis, the data analysis methods include analysis via the new environmental design guideline for mental health, comparison analysis via the case study, and SWOT analysis.

3.3.1 Analysis Through New Environmental Design Guideline

To study and evaluate the physical condition of the urban element based on the criteria of the new environmental design guideline for mental health in order to comprehend the area's current condition. Then, plan the development of the proposal according to its condition.

3.3.2 Comparative Analysis Through the Case Study

Continue using the Hong Kong and Tokyo case studies to compare and evaluate urban characteristics in order to determine the nature of the problem and its solution.

3.3.3 SWOT Analysis

Utilizing SWOT analysis to evaluate the site's strengths, weaknesses, opportunities, and threats. Determine the primary characteristics and issues of the area.

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CHAPTER 4
INVESTIGATION OF URBAN ENVIRONMENT IN SILOM-SATHORN

The investigation of the urban environment in the Silom-Sathorn neighborhood includes the introduction of a site selection area, the collection of the existing urban condition during data collection, and the application of the new environmental design guidelines for mental health during data analysis. Then, propose the area's development strategy.



Figure 4.1 Data collection and analysis framework

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The Silom and Sathorn district is located in the eastern portion of Bangkok's Central Business District (CBD), which is where the high-rise office buildings and condominiums are located. This region is considered the economic and business center of the country. Numerous corporate headquarters, government-related organizations, and educational institutions are present. During the day, the region is a bustling business district with an abundance of corporate offices. At night, the area is filled with restaurants, taverns, and bars for enjoying the city's nightlife. The constant activities caused heavy traffic and congestion.

4.1 Site Selection

As stated in the Purpose of the study (Chapter 1.3), the research-based design will be applied to the site chosen in the heart of the Central Business District (CBD), which is the center of the high-rise office buildings, high density, and packed office worker population. Focus on 400 meters of walking distance from each of the main transit stations that exist in the area which are BTS Sala Daeng, BTS Chong Nonsi, and BTS Saint Louis.

There are three reasons of selected the Silom and Sathorn neighborhood as the research-based design.

1) Urban Characteristic and Dense area – high-density developed area located in the Central Business District of Bangkok

2) User and Program – the crowded area of office workers and students

3) Potential of Public Space Development

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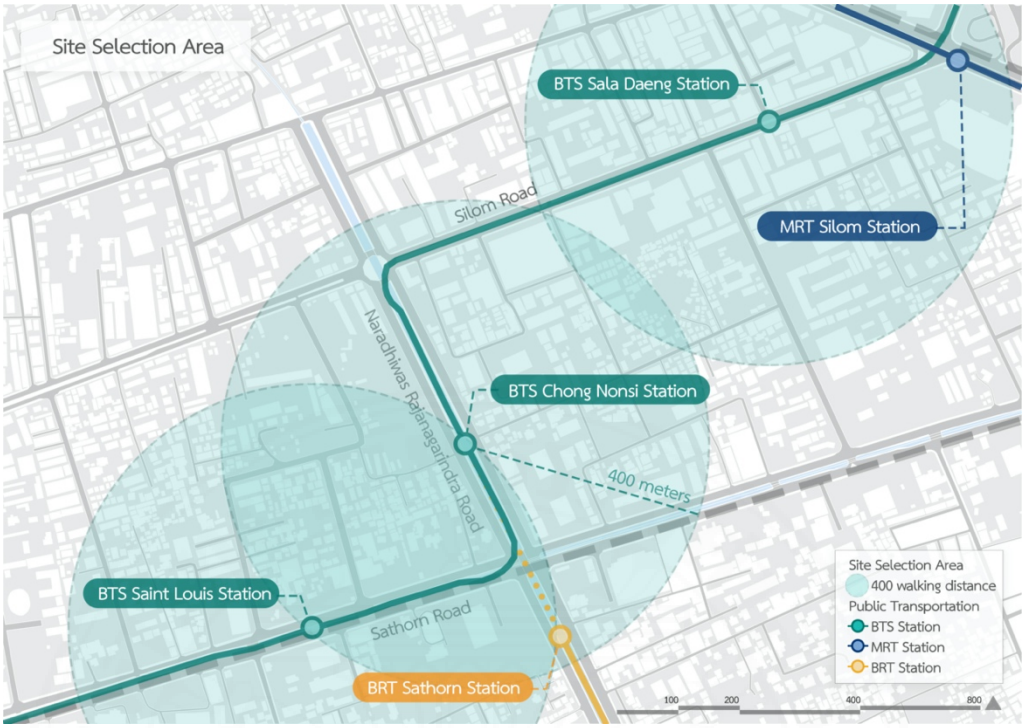


Figure 4.2 Site selection area

4.2 Data Collection

This study collects data on the Silom-Sathorn area using both primary and secondary data gathering methods, including site observation and secondary research.

4.2.1 Site Observation Result

During this phase of data gathering, site observation is used to observe the physical characteristics of the Silom-Sathorn neighborhood and examine the user behavior in the area. Low-rise buildings and shophouses, high-rise buildings without a closing gate, and high-rise buildings with a closing gate are the physical characteristics of the Silom-Sathorn neighborhood, as determined by site observation. The site observation revealed these three situations.

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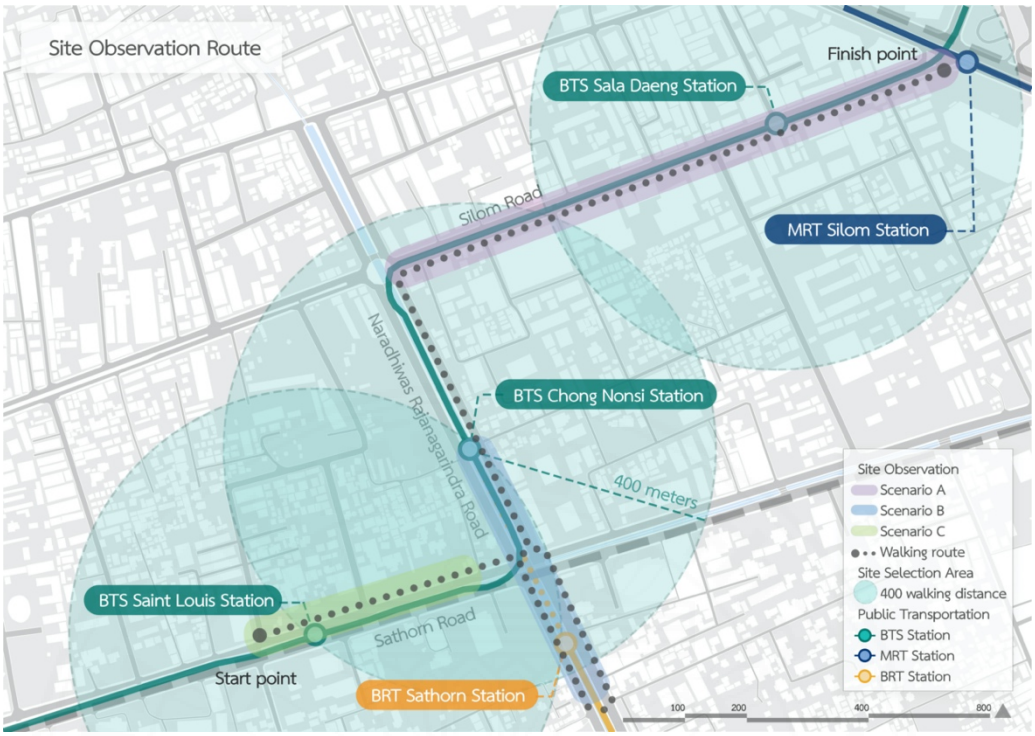


Figure 4.3 Site observation route

Typology A - on Silom Main Street surrounding BTS Sala Daeng station and MRT Silom station, low-rise buildings and shophouses are the predominant physical features. The neighborhood is situated in a high-density, low-rise shophouse development. The majority of the building program consists of office and mixed-use commercial structures. There is a skybridge connecting the BTS Sala Daeng station to the MRT Silom station for the circulation of this neighborhood. People typically only use the skywalk to access BTS and MRT stations. In places without skywalks, the vast majority of commuters walk along the paved surface. With a high concentration of human activity on the ground, the pavement's physical state is extensive, but its quality depends on the neighboring private property. The private owner of the nearby property developed and influenced the public utilities and streetscape in this neighborhood. There are street merchants on the sidewalk and obstructing the footpaths.

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Figure 4.4 Typology A - low-rise building and shophouse

Typology B – the area surrounding Chong Nonsi Skywalk is characterized by the presence of high-rise structures without a closing gate. The majority of these skyscrapers are office buildings, mixed-use commercial structures, and individual residences. As a high-rise structure without a closing gate, the public streetscape was designed to connect to the building's entry as a semi-private plaza where people are permitted to enter. The state of the streetscape that connects semi-private properties is excellent, with wide sidewalks and the construction of green corridors. Chong Nonsi Skywalk, which connects the BTS Chong Nonsi station to the intersection of Sathorn road and Naradhiwas Rajanagarindra road, is located in the middle of the area for the purpose of circulation. The majority of commuters in the area utilized public crossings rather than walking on the ground. Unused space under the BTS station, which is in poor condition and needs improvement, was identified as one of the area's weak spots. It was discovered that homeless people were squatting beneath the station near to the canal, creating a hazardous atmosphere. The majority of structures in this region only operate during the day, making it a dangerous place to

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go at night. And the disconnection of the streetscape to be developed by the private sector, resulting in the development of several streetscape areas.



Figure 4.5 Typology B - high-rise building without the closing gate

Typology C - the neighborhood surrounding the BTS Saint Louis was distinguished by the presence of a high-rise building with a closing gate. The neighborhood has private land and buildings that are surrounded by a closing gate. Within these closed gates are a variety of building programs, including an embassy, hospital, educational institution, and private official building. Because of the huge amount of land surrounding the closing gate, the area is cut off. Due to the discontinuous nature of the buildings and the length of the route, people choose to use public feeders such as the motorbike service. Due to the area's isolation, there is no special streetscape development. The physical condition of the public pavement is excellent, with large roadways but no streetscape development. Due to the lack of a streetscape to lower acceleration speed, the region is also extremely hazardous for crossing the street.

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Figure 4.6 Typology C - high-rise building with the closing gate

Important socioeconomic feature of this area is the presence of local enterprises in a global economic hub. Even the surrounding neighborhood is dense with important corporate headquarters, mixed-use developments, and luxury condominiums. However, there are local businesses around that can meet the different needs of users at an inexpensive price. The local business district includes street sellers, Lalai Sap Market, and SiamNara Market, among others.

Regarding the development of public facilities and utilities, such as streetscapes and pavement, the condition of the public utility depends on the position of the private construction that connects to the public area. Even on the same street, the condition of the public infrastructure varied. However, through attracting commercial investment, public development was gradually improving and expanding, as illustrated by the canal revitalization project.

For the area's user behavior, high traffic volume and pedestrian pedestrian access on the BTS and skywalk during peak hours. At noon, there is a large number of people near street food and local businesses. In this area, the street is quite broad, making pedestrian crossings dangerous, especially in the absence of a traffic light.

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Table 4.1

Urban typology characteristics of Silom-Sathorn neighborhood

Typology	**Typology A** – Low-rise building and shophouse	**Typology B** – High-rise building without the closing gate	**Typology C** – High-rise building with closing gate
Location	Silom road (Surrounding BTS Sala Daeng and MRT Silom)	Naradhiwas Rajanagarindra road (Surrounding BTS Chong Nonsi)	North Sathorn road (Surrounding BTS Saint Louis)
Building typology	• Low-rise building • High-rise building • Shophouse • Townhouse	• High-rise building	• High-rise building • Low-rise building • Cluster of building
Building program	• Office building • Mixed-use development • Education institute • Hospitality and accommodation	• Office building • Mixed-use commercial building • Accommodation	• Office building • Mixed-use commercial • Education institute • Embassy or government related building • Religion related building • Hospitality and accommodation
Transportation network	• Private vehicle • Access to public transportation: BTS, MRT, bus, taxi, motorbike service, tuk-tuk	• Private vehicle • Access to public transportation: BTS, bus, taxi, motorbike service, tuk-tuk	• Private vehicle • Access to public transportation: BTS, bus, taxi, motorbike service, tuk-tuk
Pedestrian network	• Skywalk connecting BTS to MRT • Street pavement	• Chong Nonsi skywalk connecting to BTS station • Street pavement	• Stresst pavement
Urban characteristic	• Pavement in good quality but depending on private sector nearby • High-density of human activity on the ground • Street vendors blocking the walkways • High traffic congestion on the street • Vacant building and old condition building	• Streetscape is in good quality, built to connect the entrant of the building create semi-private and plaza space • Disconnection of streetscape due to private development for public • High-density of human activity on the skywalk • High traffic congestion on the street • Bad condition under BTS station (dangerous) • Bad water quality in the canal • Homeless problem	• Pavement is in good quality due to private sectors nearby • No streetscape development • Long distance and disconnection network • No activity on the ground • People choose to use feeders rather than walking • High traffic congestion on the street • Dangerous for street crossing on the ground due to the wide street and high-speed acceleration

4.2.2 Secondary Research Information of Silom-Sathorn

1) History of Silom and Sathorn Neighborhood

History of Silom - The original area of the Silom neighborhood was agricultural land connected by a canal facilitating the mobility of the residents. The area was populated by people of diverse nations and cultural backgrounds. The significance of land travel was acknowledged due to the country's high foreign population. Silom Road is one of the first roads constructed in 1861 under the reign of King Rama 4 (together with Charoen Krung Road and Hua Lamphong Road). Originally known as Khwang Road, Silom Road connected the Bang Rak area (Charoen Krung Road) to Rama 4 Road, a distance of 2.78 kilometers. With the construction of the road, the land surrounding Silom Road was attracted to development and settlement, including the transportation development of the Silom Tram Line (1893 to 1907) and the first bus service in Bangkok, also known as the white bus (1908 to 1945). These transportation enhancements increase accessibility to the neighborhood and the

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commencement of the business district. The development of Silom as a business district began in 1963, when numerous low-rise and medium- to high-rise buildings were constructed for the business official, hotel, condominium, and commercial purposes. In 1999, the BTS Silom Line was created, transforming the neighborhood into one of Bangkok's most prominent central business districts.

History of Sathorn – After the first constructed road was developed in 1861, the area became more appealing for commercial purposes, and a large number of foreign merchants, including Chinese and Europeans, settled there. In 1888, under the reign of King Rama V, more roads, including Sathorn Road, were built due to the lack of a transportation system to support the logistics of commodities and products. The route connecting Charoen Krung Road and Rama 4 Road is Sathorn Road (Parallel with Silom Road) The King Taksin the Great Bridge was constructed in 1979 to span the Chao Phraya River and connect Bang Rak District to Bangkok's western side. After the construction of the bridge, the region was transformed into the Central Business District to attract businesses and commercial enterprises. The Sathorn district is home to high-rise business executives, A-class financial firms, commercial, mixed-use, luxury condominium & residential, embassies, and other institutions. In 1999, the BTS Silom Line opened in the Sathorn District. (BTS Chong Nonsi, BTS Surat Thani, and BTS Saint Louis) The region surrounding Sathorn Road continues to develop and become one of Bangkok's key areas that produce a significant economic impact.

2) Physical characteristics of Silom-Sathorn

The Silom and Sathorn district is characterized by the existence of high-rise office buildings and luxury condos. Due to the area's significance as a commercial hub for the Chinese and European communities, it still contains Chinese shophouses and European architecture structures.

Location - The Silom and Sathorn neighborhood is the area located in Bang Rak and Sathorn District of Bangkok city on the eastern part of the Chao Phraya River.

- North – connecting with Pathum Wan district
- South - connecting with Yan Nawa and Bang Kho Leam District
- East – connecting with Pathum Wan, Yan Nawa, and Khlong Toei

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- West – connecting with Khlong San District

The population in Bang Rak District is 45,757 people (2020) in an area of 5.54 square kilometers. The density of the area is 8,259 people per one square kilometer.

The population in Sathorn District is 75,735 people (2020) in the area of 9.32 square kilometers. The density of the area is 8,120 people per one square kilometer.

According to the statistic of Thailand's population, the majority population in the Bang Rak and Sathorn districts are adults (25-59) followed by teenagers (15-24) (The Bureau Of Registration Administration, 2020).

Building typology – The majority of buildings in the neighborhood are high-rise structures. With the long history and culture of the place, there are significant architecture styles that reflect the diversity of culture and people, such as the neo-Gothic architecture styles (missionary accommodation), neo-classical architecture shophouse, Chinese shophouse, Brutalism, Thai contemporary, Patterned facade, and postmodernism.

Building program – Silom and Sathorn are home to mixed-use official buildings, government and non-government structures, luxury condominiums and residential, cultural buildings, a commercial mall, café, and restaurant.

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Public transportation - Being the Central Business District (CBD), the area has high traffic volume in rush hours. For public transportation, there are 3 BTS stations (BTS Sala Daeng, BTS Chong Nonsi, and BTS Saint Louis)

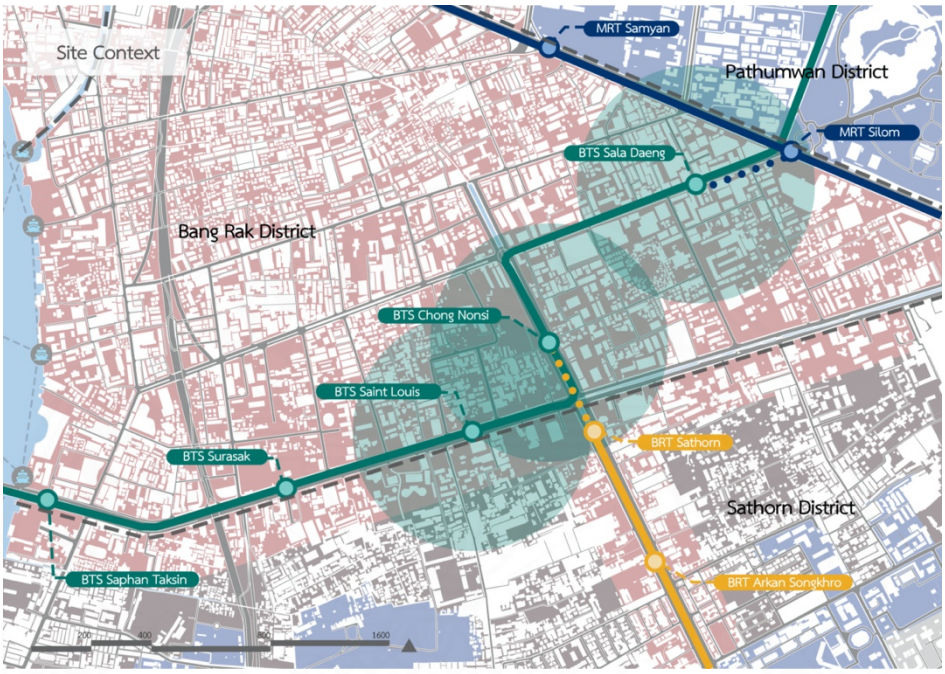


Figure 4.7 Site context

3) Socioeconomic Characteristic of Silom-Sathorn

The neighborhood is populated by people of diverse nationalities and cultures due to its historical significance as a commercial hub for goods and commodities. There are four distinct civilizations inside the Silom and Sathorn neighborhoods: Buddhist, Christian, Chinese, and Hindu. Numerous religious establishments in the Silom and Sathorn areas provide evidence of the region's cultural diversity.

Buddhism Temple (Wat Yannawa) – Buddhism was introduced to Thailand during the period of Thailand's Ancient Kingdom and continues inherited as part of Thailand's tradition and culture until now. The establishment of the Yannawa temple was in the Ayutthaya Kingdom at the same time as people settlement. The temple was reestablished in King Rama 3 period and is being preserved until the present day.

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Christian Church (St. Louis Church) – with being the area that is full of westerner who comes for trading and business, the Christian was introduced in the area with Roman Catholics Church called St. Louis in 1958.

Chinese Shrine (Chiao eng biao shrine) – since this area was the important trading location in the part, Chinese merchants were coming to Thailand for trading goods and settlement. The culture of Chinese worship was inherited from those Thai-Chinese families who settlement in Thailand. Chiao eng biao shrine was established for being the memorial place of Hainan people who were killed during a traveling to Vietnam.

Hindu Temple (Sri Maha Mariamman Temple) – Sri Maha Mariammam Temple was established in 1910-1911. The temple is the place of worship for Hindu people in the part that came to settle in Thailand. Nowadays, the temple become famous for tourists and wish for love.



Figure 4.8 Socioeconomic characteristic of Silom-Sathorn

4) Current Project and Future Development

Located in the Central Business District with a large number of commuters, the area not only attracts a great deal of private sector commercial and

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business investment. In addition, attract the public development project that will preserve and enhance the area's physical condition and utilities.

In Klong Chong Nonsi, a canal revitalization project is now under construction. This project proposes to improve the irrigation and drainage system of the Bangkok canal and expand the amount of green public space. The initiative focuses on restoring physical conditions and connecting the land and water public transit network. The project's 4.5-kilometer-long development is separated into 5 phases: Surawong road to Sathorn road, Sathorn road to Soi Naradhiwas Rajanagarindra 7, Soi Naradhiwas Rajanagarindra 7 to Chan road, Chan road to Ratchadaphisek road, and Ratchadaphisek to Rama 3 road. The first construction phase begins 200 meters from the intersection of Sathorn Road and Soi Naradhiwas Rajanagarindra 7. The development consists of three sub-zones: activity space, skywalk, and BRT station access.



Figure 4.9 Khlong Chong Nonsi recreation project

This canal restoration project will expand green public space, improve water quality, minimize environmental problems and pollution, encourage

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social contact activities, relaxing areas, and exercise spaces, according to the project's long-term goals.

4.3 Data Analysis

The study uses the new environmental guideline for mental health as the analysis tool to identify the physical state of the area, comparative analysis through the case study, and SWOT analysis to determine the possibilities and limitations for site selection.

4.3.1 Analysis through the new development guideline

1) Access to Nature – to study the existing condition of green space and determine the quality of urban element for finding to suitable development solution.

(1.1) Green Space in Bang Rak District

According to data on Bangkok's green space provided by the Department of Environment and Department of Strategy and Evaluation, the number of green spaces in the Bang Rak District is 370, totaling 267,375.08 square meters. In comparison to the district's population (45,757), the population density per square meter is 5.84 square meters per person. The green space ratio in the Bang Rak District is below the minimum standard recommended by the World Health Organization (WHO), which is 9 square meters per person.

Over 79 percent of the green area in the Bang Rak District is owned by the private sector, 7.7 percent by the public sector, and over 12 percent by other organizations.

The majority of 7.7 percent of public green space consists of streetscape, pocket parks, and public parks. Bangkok's public streetscapes contain the only functional routes that increase the city's walkability. Without adequate development, however, the public streetscape in Bangkok lacks maintenance, is of poor quality, and is physically disconnected, preventing them from reaching their full functional potential.

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Within 12 percent of green space development from other groups, the vast majority of green space is developing as private pocket parks that the public cannot access.

Within more than 79 percent of private green space, a quarter was designated as nonfunctional and empty. The majority of private greenspaces consist of private pocket parks that are inaccessible to the general public. Additionally, some private green spaces are semi-private as a result of the development of adjacent public areas that provide access to the space by all.

(1.2) Green Space in Sathorn District

There are 226 green areas in the Sathorn District, which have a total area of 759,301.2 square meters. The ratio of green space in Sathorn is 10.03, which exceeds the World Health Organization's minimum requirement (WHO). Even if the ratio of green space exceeds the guideline threshold, the bulk of green space is still privately held, preventing access to the space and limiting the functionality of the region.

The private sector owns 68 percent of the green space in the Sathorn District, while the governmental sector owns over 13 percent and other groups hold 18 percent.

The majority of public green space types within over 13 percent of Sathorn's green space include streetscape, pocket park, canal scape, and public park. For pocket space in the Sathorn neighborhood, the majority of public pocket parks are small and devoid of activity, preventing people from realizing the space's full potential. Compared to public parks, pocket parks offer less opportunities for recreation. Even the public park is the best option to create for public space, but Bangkok's conditions and space may not allow for the development of a public park, therefore the pocket park should be able to fulfill the functional, quality, and activity requirements of a public park.

There are public and semi-private places, such as sport facilities, pocket parks, and public parks, within 18 percent of green space owned by other organizations.

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Within 68 percent of privately owned green areas, the majority of the space is functional but not accessible to the general public. In addition, several private undeveloped lands have substantial development potential.

2) Active and Exercise – determine the urban element that encourages walking and exercise in the Silom-Sathorn neighborhood

Bangkok's pedestrian and streetscape design may not be able to improve the city's walkability due to its poor quality, lack of maintenance, and disjointed development. But the skywalk is the urban element that works effectively and can improve walkability in Thailand. The example of Chong Nonsi Skywalk, which is widely used to connect individuals from the BTS station to their workplace without requiring them to cross the street and risk a car accident. The skywalk connecting the BTS and MRT station at Silom road is also an effective means of avoiding street traffic (without involving oneself in vehicular traffic). Unlike Naradhiwas Rajanagarindra and Sathorn road, Silom road is distinguished by its characteristics. The physical condition of the street on Silom road is characterized by a commercial and mixed-use program that generates on-ground activity, and the building typology of area shophouses and low-rise buildings can create a greater density of users on the street than on Naradhiwas Rajanagarindra and Sathorn roads, which are dominated by high-rise buildings with commercial purposes.

For exercise in the Silom-Sathorn neighborhood, public sports facilities in Bangkok, such as a public park, can stimulate physical activity. Currently, the Sathorn canal is undergoing public greening development. The new landmark in the neighborhood may draw a rising number of new users in the future.

3) Safety Management – the city's safety: crime and accidents.

The city's safety can be subdivided into safety from crime and safety from accidents. A safe management facility and the condition of the urban environment that can provide safety for people determine safety management. Due to the homeless problem and blind spots under the BTS railways, the Silom-Sathorn neighborhood's physical environment cannot instill a sense of security.

N. Sathorn Road is a large, dangerous street for pedestrians to cross. The Chong Nonsi Skywalk can lessen the dangers of crossing the street in the region.

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BMA provides a public CCTV system at Silom road as the safety management facility for the Silom-Sathorn neighborhood. The public CCTV is inoperable owing to the inability to access the data footage when a citizen is required. In the vicinity of the site, there are three private hospitals and one governmental hospital that provide emergency services and medical care.

4) Sensory Management – noise, light, and odorous management. In the Silom-Sathorn neighborhood, sustainable options for sensory management are missing. Existing sensory management relies on manual labor and regulatory oversight. The existence of a streetscape aids in minimizing traffic-related noise and air pollution.

5) Transportation and Pedestrian – transportation on the ground and by train, ground-level and elevated pedestrian walkways. Numerous individuals choose private vehicles over public transportation, resulting in a high volume of traffic congestion on the street and unpredictable travel times on the ground. Schedules for public transit, such as the BTS and MRT, facilitate time-efficient travel. For pedestrian walkways, the current skywalk connecting BTS to Chong Nonsi Skywalk and MRT station promotes walkability in the neighborhood. However, the poor condition of the streetscape and absence of ground-level activities cannot promote walkability.

6) Pollution Control and Management – air and water pollution

In the Silom-Sathorn neighborhood, sustainable pollution control and management methods are insufficient. Existing sensory management relies on manual labor and regulatory oversight.

7) Encourage Social Interaction and Activity – public area for interaction The physical condition of urban characteristics in the Silom-Sathorn neighborhood can generate social interaction and activity, particularly on Silom road, which is home to a historic shophouse and a high-density construction area that generates activity on the ground. Public transport stops as public hubs can facilitate human contact. Existing semi-private plaza and mixed-use commercial in the region also encourage social interaction.

8) Social Insecurity Service and Support – universal service and design. Private facilities, such as BTS stations, MRT stations, commercial buildings, and hospitals, have universal design. On the other hand, the streetscape and public

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transportation on the ground lack universal design facilities. Some policies and organizations help improve the living conditions of vulnerable persons who lack service and support facilities in order to assist them.

9) Reducing Economic Stress and Affordable – with affordable price

Even though the Silom-Sathorn neighborhood is located in the Central Business District (CBD), where most amenities are pricey and have high costs, there are local enterprises (street vendors, Lalai Sap Market, and SiamNara Market) that make the region financially accessible.

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Table 4.2

The urban characteristic of Silom and Sathorn neighborhood

Environmental Design Guideline	Urban characteristics in Silom-Sathorn neigborhood	Advantage (+)	Disadvantage (-)
Access to nature	• Total green space in Bang Rak district is 267,375.08 square meters which can count as 5.84 square meters per person (79% private own, 7.7% public own, 12% other) • Total green space in Sathorn district is 759,301.20 square meters which can count as 10.03 square meters per person (68% private own, 13% public own, 18% other) • The majority of green space is owned by the private sectors • Public green spaces are including of streetscapes, pocket parks, canalscapes, and public parks • Unfunctional public green space (streetscape design cannot enhance walkability in the area) • Unfunctional public pocket parks (pocket park cannot fill in the needs of the public park in terms of function, activity ,and quality) • Undeveloped space in private green spaces • Private green space is inaccessible	• Green space in Sathorn district is above the standard number of WHO recommendation • Currently blue-green infrastructure development project in Chong Nonsi canal • Green space development in the public area that owned by private sectors • Green Bangkok 2030, the development to increase green space in Bangkok	• Green space in Bang Rak district is below the standard number of WHO recommendation • Public green spaces are lacking maintenance and unfunctional • Inaccessible to water resource • Uncertain development of public green space (physical disconnected streetscape development) • Majority of green space is owned by the private sector which is inaccessible • Undeveloped space in private green space
Active and Exercise	• Silom-Sathorn neighborhood is located in CBD which is the location of high developing commercial and mixed-use areas causing the area to be active • Majority of sports and exercise facilities are owned by private sectors (membership system and pay-for-using facility) • Public sports facility is provided in the public park • Urban characteristics and physical condition of the street pedestrian on Silom road enhance walkability in the area • Urban characteristics and physical condition of the street pedestrian in N. Sathorn road surrounding BTS Saint Louis station cannot be able to enhance walkability in terms of physical condition and on-ground activity • Skywalk pedestrians can encourage walkability in the area (Chong Nonsi Skywalk and Skywalk connecting BTS to MRT)	• Urban characteristic of Silom road is designed to enhance walkability • Skywalk pedestrians can encourage walkability in the area • Public sports facility in a public park is accessible	• Urban characteristics and physical condition of the street pedestrian in N. Sathorn road surrounding BTS Saint Louis station cannot be able to enhance walkability in terms of physical condition and on-ground activity • Streetscape design is not designed to concern other activities on the ground (cycling, scooter, skateboard, street vendor) • Most sport and exercise facility is owned by private and not for free
Safety Management	• Traffic control management system • Pedestrian skywalk for street crossing • High density on the ground activity of Silom road and traffic conditions lead to lower speed accurate • Low density on the ground activity of N. Sathorn road lead to higher speed accurate • Wide alleys and streets create difficulty for street crossing on the ground without a traffic light • Public CCTV from BMA only exists on Silom road • Public CCTV management system is unfunctional (difficulty of getting the footage when the citizen is needed) • There are three private hospitals nearby the site study • Banshee General Hospital is the nearest public organization hospital • Community healthcare is existing nearby the communities area • Homeless problem (under BTS station)	• Traffic management • Existing public and private security control (CCTV) • Lower speed accuracy at Silom road create safety for on-ground activity • Higher on-ground activity creates eyes on the street • Pedestrian skywalk for street crossing • There are many hospitals and healthcare located in site study	• Dangerous for street crossing with the wide alley or street at N. Sathorn road • Lacks on-ground activity on N. Sathorn road (lack of eyes on the street) • Difficulty of getting BMA CCTV footage (CCTV is unfunctional) • Private hospital cost more expensive and are unaffordable • Homeless problems and blind spots under BTS railways
Sensory Management	• Silom and Sathorn neighborhoods are a busy and active area • Noisy from traffic and on-ground activity • Streetscape design as green buffer area (reducing noise pollution) • Dark area and blind spot under the BTS railway • With being all-time active area can create light pollution at night (community and residential) • Pollution from the scent of the trash, water pollution, and air pollution • Law and regulations concerned with sensory management • Lacking of sustainable solutions for sensory management in the area • Trash management control from BMA • Water and air pollution control regulation	• Being busy and active in the neighborhood create safety and eyes on the street • Trash management both on the ground and in waterways • Streetscape can reduce noise pollution • There is the regulation control related to sensory management (noise control, light control, contribution of toxic pollution)	• Sensory management control in the Silom-Sathorn area is denpendent on human labor no sustainable solution for pollution prevention and treatment (light, noise, smell) • Noisy from traffic and on-ground activity • Dark area and blind spot under the BTS railway • Pollution from the scent of the trash, water pollution, and air pollution

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Table 4.2

The urban characteristic of Silom and Sathorn neighborhood (Cont.)

Environmental Design Guideline	Urban characteristics in Silom-Sathorn neigborhood	Advantage (+)	Disadvantage (-)
Transportation and Pedestrian	• Various choices of public transportation (BTS, MRT, BRT, bus, motorbike service, tuk-tuk) • Pedestrian walkway both on the ground and skywalk (Chong Nonsi Skywalk and skywalk connecting BTS Sala Daeng and MRT Silom) • High volume of traffic congestion on both Silom and N. Sathorn road leads to uncertain time management on street • High number of the private vehicle used in the area • Physical condition of the street pedestrian at BTS Saint Louis station can not encourage walkability in the area (bad pedestrian walkway and lacking on-ground activity) • Unstable streetscape development on the ground at Naradhiwas Rajanagarindra, N. Sathorn, and	• Various public transportation choices (BTS, MRT, BRT, bus, motorbike service, tuk-tuk) • Upper ground level (BTS) and underground level (MRT) of public transportation have certain time schedules (be able to manage time traveling) • Existing skywalk connecting from BTS encourage walkability in the area both at Chong Nonsi Skywalk and MRT Silom • High density of human activity on the ground at Silom road can encourage walkability	• Many people choose private vehicles rather than public transportation • High volume of traffic congestion • Uncertain time traveling on the ground • Streetscape is unstable development (private develop public space in front of their property) • Bad pedestrian conditions and lacking on-ground activity can not encourage walkability
Pollution Control and Management	• Bad water condition (Pollution in the water – dirty and unhygienic water condition) • Air pollution from traffic congestion and carbon-generated activity • Littering problem • Trash management control from BMA • Water and air pollution control regulation • Lacking sustainable solutions for toxic pollution management in the area	• Trash management both on the ground and in waterways • There is the regulation on pollution control and management	• Lacking sustainable solutions for toxic pollution management in the area • High number users of private vehicles and traffic congestion that conducted air pollution • Littering problem
Encourage Social interaction and Activity	• Public transportation stations can encourage social interaction and activity (BTS and MRT stations as public nodes) • Existing semi-private plaza design and mixed-use commercial surrounding BTS Chong Nonsi encourage social interaction and activity in the area • Building program and activity on the ground at Silom road can enhance street activity and walkability • Public parks and streetscape in the area • Lacking public facility outdoor space	• Transportation nodes • Plaza-design and mixed-use commercial design surrounding BTS Chong Nonsi encourage social interaction and activity • Physical condition and building program at Silom road enhance street activity and walkability • Public park nearby	• No physical design to encourage interaction in public outdoor space
Social Insecurity Service and Support	• Universal design is provided on BTS and MRT stations (lacking universal design facility on the street and public transportation on the ground) • Located of hospital and healthcare nearby • Policy that enhances better living quality for vulnerable people (organization support disabled people, organization support elder people) • Lacking service and support for vulnerable people	• Healthcare nearby • Universal design is provided on BTS and MRT stations • Policy that enhances better living quality for vulnerable people (organization support disabled people, organization support elder people)	• Lacking of service and support for vulnerable people • Universal design is not provided on street and public transportation on the ground
Reducing Economic Stress and Affordable	• Silom and Sathorn neighborhood is located in CBD, the services and facilities in the have high price and expensive • Existing local businesses and economic nearby that in affordable prices to all • Accommodation is expensive • Public transportation is affordable (BTS and MRT are expensive) • Lacking affordable price accommodation	• Affordable facilities providing in the area (food, transportation price, accommodation)	• Most of the facilities in the area have a high price and expensive • BTS and MRT are expensive • Lacking affordable price accommodation

Table 4.3

Quality of urban element in Silom and Sathorn neighborhood

Environmental Design Guideline	Accessible and Functional	Active	Affordable
Access to nature	• Streetscape is accessible and functional but bad in quality • Some pocket park is accessible but unfunctional (no use) • Public park is accessible and functional • Private green space is inaccessible	• Streetscape and canal scape are active for walking, but the physical condition can not enhance walkability in the area • Most of the public pocket parks have no use and no activity • Public park is active	• Public green space is affordable (most public green space is free)
Active and Exercise	• Public park is accessible and functional • Streetscape is accessible and functional but bad in quality • Private sports complex	• Public park is active • Streetscape and canal scape are active for walking, but the physical condition can not enhance walkability in the area • Private sports complex is active	• Public park is affordable (free) • Streetscape is affordable (free) • Private sports complex is expensive
Safety Management	• BMA CCTV footage is inaccessible and unfunctional (hard to get the data and footage) • Hospital and emergency services in area are accessible and functional • Street light at night	• CCTV is active but unfunctional to use • Hospital is 24 hours active • Shops that open at night create activity and safety	• CCTV is free but unfunctional • Public hospital is affordable • Activity at night and eyes on street is free
Sensory Management	• Lacking sustainable solution for sensory management (no physical solution) • Tree and streetscape are accessible and functional	• Streetscape is active	• Streetscape is affordable (free)
Transportation and Pedestrian	• Various public transportation chioces • Accessible and functional	• BTS, MRT, BRT are convenient but require higher prices (high density of users during rushing hours) • Bus have a high density of uses (cheaper but cannot do time management) • Motorbike and tuk-tuk is depended on the time traveling	• BTS, MRT, BRT are expensive • Bus is affordable but bad in quality and time management • Motorbikes and tuk-tuk are depend on the distance, but affordable
Pollution Control and Management	• Lacking sustainable solution for pollution control (no physical solution) • Tree and streetscape are accessible and functional	• Streetscape is active	• Streetscape is affordable (free)
Encourage Social interaction and Activity	• Public interaction area is accessible but unfunctional (mostly are open spaces without use) • Lacking facility to enhance activity	• High density of people but no activity (people mostly walk pass though)	• Public interaction area is affordable (free)
Social Insecurity Service and Support	• Lacking social insecurity service • Universal design on streetscape is accessible but unfunctional (universal design is required to design following law and regulation but the quality of the universal design in public facility is unfunctional) • Universal design on transit station is accessible and functional • There is one public hospital and three private hospitals nearby	• Universal design on the streetscape have no used (inactive) • Universal design on transit station have used (active) • Public hospital is active (high density of users) • Private hospitals are active but have a lower density than public hospitals	• Universal design is affordable (free) • Public hospital is in affordable price • Private hospital is expensive
Reducing Economic Stress and Affordable	• Local shops and markets are accessible and functional (located nearby the office area and within walking distance from BTS station)	• High density of people in local shops and markets (street vendors, Lalai Sap Market, and SiamNara Market)	• Transportation is expensive (BTS, MRT, high price of gasoline) • Food and beverage are affordable (existing local shops) • High price of accommodation in the area (lacking affordable housing)

4.3.2 Comparative Analysis Through Case Study

Continue using the Hong Kong and Tokyo case studies as the comparative case study analysis for the new mental health environmental design guidelines. To identify the positive and bad urban characteristics of each city, and then to create the Silom-Sathorn community effectively.

By studying each urban characteristic through the establishment of new environmental guidelines, each city's urban element can be identified uniquely. The research can immediately reveal whether nation has a high-quality urban environment and effective law and regulation control over public facilities. Which nation lacks urban infrastructure and authority? Then, clearly indicate the physical status of every urban piece. The physical condition is split into three categories: good, poor, and fine.

After labeling, we will be able to comprehend the positive and negative urban traits that impact the urban environment's physical state. Then, using the data information to improve the city's weaknesses and utilizing the strong points of other nations to generate remedies.

Ref. code: 25656316123063BUO

Table 4.4

The comparative analysis of case study

Environmental Design Guideline	Silom-Sathorn neigborhood	Hong Kong	Tokyo
Access to nature	• Green space is provided from streetscape, pocket park, canal scape, and public park. • Lacking accessible and functional green space (most green spaces are private) • The streetscape, canal scape, and pocket park cannot encourage activity and use • Public public can enhance activity in green space area • Pocket park and public park is in good condition and high-quality maintenance • Streetscape and canal scape are provided in bad condition and low-quality maintenance • Public green space is free	• Lacking green space (with limited space) • Land development in Hong Kong is giving importance for business-related project • Incensive and policy to encourage green feature development • Green space is integrated into the architecture development • Most public green space in Hong Kong is small, in bad condition, and low-quality maintenance (green space require a high cost for maintenance) • Public green space is free	• Green element is integrated with public infrastructure to create accessibility for people • Many policies and incentives encourage the development of green space • Green space in Japan is part of the disaster management control • The physical condition and design encourage the use of space • High-quality maintenance with strict rules and regulation control lead to inflexible function and activity • Public green space is free
Active and Exercise	• Urban facilities encourage walkability (skywalk and well-design pedestrian walkway) • Exercise in public park • Exercise in private sports facility	• Public transport-oriented city • Urban environment encourage walkability, transit station nearby, but low-quality of infrastructure • Exercise in the private sports facility	• Public transport-oriented city • Urban environment encourage walkability, high-quality streetscape design, good infrastructure, public transit is located within walking distance • Sports complex is expensive (not popular to exercise, only walking)
Safety Management	• Active city creates eyes on the street • CCTV footage is inaccessible and unfunctional • Wide alleys and streets create difficulty for street crossing on the ground without a traffic light • Healthcare and emergency service nearby	• Active city creates eyes on the street • CCTV monitoring • Narrow street and crowded • Dark and blind spot • Women traveling alone can be dangerous	• Active city creates eyes on the street • Prioritizing safety in both crime and natural disaster • Design intervention for natural disaster
Sensory Management	• Noise from traffic • Dark and blind spot • Streetscape can help reduce noise • Smelly from trash and water pollution • Trash management control from BMA • Water and air pollution control regulation • Lacking sustainable solutions for sensory management in the area	• Noise from traffic • Dark and blind spot • Streetscape can help reduce noise • Building Ordinance guidelines including noise-reducing design (incentives features)	• Streetscape can help reduce noise • No good environment for sleep • Active and busy city • Noise and light pollution affect quality of sleep
Transportation and Pedestrian	• Various choices of public transportation (BTS, MRT, BRT, bus, motorbike service, tuk-tuk) • Pedestrian walkway both on ground and skywalk • High volume of traffic congestion • BTS, MRT, BRT are convenient but require higher prices (high density of users during rushing hours) • Bus have a high density of user (cheaper but cannot do time management)	• Public transport-oriented city • Various choices of public transportation (railways, tramways, funicular railways, trains, buses, public light buses, taxis, ferries, cable cars) • Well-design public transport system • Over 41% of residents living within walkable distance from public transportation • Alternative payment system • Public transportation system encourage walkability • High volume of traffic congestion	• Public transport-oriented city • Accessible to public transport • Seamless city (mass transportation and feeder) • Well-design and management of public transportation system • With the limitation of space, the design of public transit is complex and leads to getting lost • High-speed railways system is expensive
Pollution Control and Management	• Bad water condition • Air pollution from traffic congestion and carbon-generated activity • Littering problem • Trash management control from BMA • Water and air pollution control regulation • Lacking sustainable solutions for toxic pollution management in the area	• Air pollution is a major issue in Hong Kong, contribute by motors vehicles, marine vessels, and power plants • High volume of traffic congestion • Well-design public transport system create low car ownership • Policy development to reduce air pollution	• Good quality of air condition • Air pollution contributes by motors vehicles and factory • EV cars using • Well-management and control on air quality

Table 4.4

The comparative analysis of case study (Cont.)

Environmental Design Guideline	Silom-Sathorn neigborhood	Hong Kong	Tokyo
Encourage Social interaction and Activity	• Public interaction area is accessible but unfunctional (mostly are open spaces without use) • High density of people but no activity (people mostly walk pass though) • Lacking facility to enhance activity	• Indoor social interaction space (commercial area, office lobbies, etc.) • Public space in the residential unit • Sitting out space for socializing and resting • Design guidelines for social interaction space in residential area • Space for avoiding crowded and busy environments (resting area)	• Indoor social interaction space (shopping mall, restaurant, office) • Outdoor social interaction space (public park, plaza at transit station, temples, shrines) • Citizens in the community can participate in local development (Machizukuri) • Lacks social public space (limited space) • High number of social issues • Individuals living lead to unhappiness, lacks social interaction, become insecure, shy, and talk less
Social Insecurity Service and Support	• Lacking social insecurity service • Universal design on streetscape is accessible but unfunctional (universal design is required to design following law and regulation but the quality of the universal design in public facility are unfunctional) • Universal design on transit station is accessible and functional • There is one public hospital and three private hospitals nearby	• Health services and facilities in the city • Universal design • Addiction treatment center • The Narcotics Division (NGO) has drug rehabilitation service for voluntary people • Mental health is not the priority for developing city • Lacks support faclity for vulnerable groups • Financial issues	• Mental health is not being recognized as health issue but the synonymous of mental illness • Super-aged society • Homeless • Social pressure • High suicide rate • Drinking alcohol in Japan is part of their cultures • Business life requires drinking (nomunication – to drink and communication) • Heavy drinking is social norm • The architecture design guideline include universal design • Good quality of public facilities and utilities • High social pressure in education, working environment, and family factor • High competitive environment of studying and working leads to high stress and depression • Social pressure leads to social withdrawal (Hikikomori)
Reducing Economic Stress and Affordable	• Local shops and markets are accessible and functional (located nearby the office area and within walking distance from BTS station) • High density of people in local shops and markets • Transportation is expensive (BTS, MRT, high price of gasoline) • Food and beverage are affordable (existing local shops) • High price of accommodation in the area (lacking affordable housing)	• High living expenses in the city • High land price residential • High competitive city • Affordable housing in the city center area • Lacks affordable housing • High density of population • Low-quality housing • Unsafety environment • High-cost and small living space • High -tress levels in the working environment	• High living expense • High economic stress • High stress in studying and working environment • High competitive environment • Affordable price • Affordable housing in the city • Good public recognize and support stress reduction • Environment-related economic lead to higher stress levels • Expensive housing price with small space

Good condition Bad condition Fine

4.3.3 Analyzing of Potentials and Constraints Through SWOT Analysis

The development solutions for the potential and constraints affecting the project development of each urban typologies in the site-selected area

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are established using a SWOT analysis, which consists of four factors: strength, weakness, opportunity, and threat.

SWOT Analysis of Typology A

Strengths	• The site selection is located in the Center Business District (CBD) of Bangkok with high density of business related development and user • Various choices of public transportations and easy accessible to the site selected area (BTS, MRT, bus, motorbike, etc.) • Good accessibility through Silom road (connecting Charoen Krung road and Rama IV road) • The neighborhood area is crowded and high density of activity on ground • The site selected area is in community area • Located of diversity of culture and traditional in the area • Located of education institute nearby • Located of hospital nearby
Weaknesses	• The physical urban condition is old shophouse with bad condition • The pedestrian walkway is in bad condition and small pavement • No streetscape design • No inclusive design • Silom road have high volume of traffic congestion • Air pollution problems through traffic congestion • Street vendors blocking pedestrian walkways • Vacant space and building due to high land rental
Opportunities	• High opportunity of land development: old building and vacant space will be turn to mixed-use development and commercial • Higher land price and rental can attraction investors to invest in the area
Threats	• Gentrification due to higher land price and future development, local people may not be able to afford the rental price • Losing the original culture of the area

Figure 4.10 SWOT analysis of typology A

Ref. code: 25656316123063BUO

SWOT Analysis of Typology B

Strengths	• The site selection is located in the Center Business District (CBD) of Bangkok with high density of business related development and user • Various choices of public transportations and easy accessible to the site selected area (BTS, BRT, bus, motorbike, etc.) • Skywalk connecting BTS Chong Nonsi station to office building area • Wide pedestrian walkways • Semi-private space in front of mixed-use and office building can create node and gathering space (plaza) • Ongoing green and blue infrastructure development project
Weaknesses	• Disconnected pedestrian development on ground due to private sector developing public space • Bad street condition and dangerous under BTS station • Homeless problem • Water and air pollution • No inclusive design • High volume of traffic • Dangerous for crossing the street on ground
Opportunities	• Ongoing green and blue infrastructure development project can attract business and investor to invest in the area • Being in Central Business District (CBD) leading to land development (old building or the area that not reach high potential development) • The future project development attract new user to the area
Threats	• Gentrification due to higher land price and future development • The future project development lead to heavier traffic volume

Figure 4.11 SWOT analysis of typology B

Ref. code: 25656316123063BUO

SWOT Analysis of Typology C

Strengths	• The site selection is located in the Center Business District (CBD) of Bangkok with high density of business related development and user • Various choices of public transportations and easy accessible to the site selected area (BTS, BRT, bus, motorbike, etc.) • Wide pedestrian walkway • Community area • Diversity of culture and traditional • Located of education institute nearby • Located of hospital nearby
Weaknesses	• Bad condition of pavement • No streetscape design • No inclusive design • High volume of traffic • No ground activity and street connectivity • Pedestrian walkway not encourage people to walk • Dangerous for crossing the street on ground
Opportunities	• High opportunity of land development: mixed-use development and residential • The future project development attract new user to the area
Threats	• Gentrification due to higher land price and future development • The future project development lead to heavier traffic volume

Figure 4.12 SWOT analysis of typology C

4.4 Silom-Sathorn Neighborhood Development Strategy

The development strategy for the Silom-Sathorn area must include the improvement of physical environmental conditions and the provision of functional and accessible infrastructure. Then, suggest laws and regulations as a means of stimulating and controlling development in order to resolve current urban problems and incorporate urban elements that improve the mental health of region residents.

Ref. code: 25656316123063BUO

Table 4.5

Development strategy

Design Solution	Improve Environmental Condition	Provide Facility	Law and Regulation
Access to nature	O	O	O
Active and Exercise	O	O	O
Safety Management	O	O	O
Sensory Management	O	O	O
Transportation and Pedestrian	O	O	O
Pollution Control and Management	O	O	O
Encourage Social interaction and Activity	O	O	O
Social Insecurity Service and Support		O	O
Reducing Economic Stress and Affordable		O	O

4.4.1 Silom-Sathorn Urban Strategy Development

The urban strategy development will be included the strategy design guideline of the urban element in order to improve the quality of the environment and propose facilities suggestions in the area.

1) Access to Nature - according to the World Health Organization's recommendation of 9 square meters of green space per person, the Silom-Sathorn neighborhood's public green space should be enhanced to at least 9 square meters per person. By providing public green space areas, incorporating green features into public infrastructure, and integrating building structures, nature is made more

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accessible. Moreover, the physical condition and function of the urban green space in the area should be examined in order to maximize space utilization. Included in design development are public parks, pocket parks, streetscape, canal scape, vertical gardens, biophilic design, and green roofs, among others.

2) Active and Exercise – to increase movement and exercise in Silom-Sathorn, emphasis should be placed on promoting walkability by improving pedestrian conditions and establishing a public exercise facility. By enhancing the physical condition and offering the facility, pedestrian development should take into account the various types of use. Providing a public park or pocket park that encourages physical activity in the region is a public facility for exercise. Streetscape and pedestrian development for walking, cycling, skating, longboarding, scooters, etc. are incorporated into the design process.

3) Safety Management – to provide a safe environment for the Silom-Sathorn neighborhood, the area's physical condition should be upgraded to prevent both criminal and accidental threats. The security monitoring system should be open to the public, and citizens should have access to the data. By constructing physical public infrastructure, enhancing intelligent CCTV surveillance, slowing traffic, and designing crime prevention measures, etc.

4) Sensory Management – consider the physical architecture that can lessen and prevent noise pollution, such as a green buffer. The lighting issue should be addressed with intelligent lighting that automatically adjusts to eliminate blind spots and illuminating regions. The odorous issue can be remedied through natural purifying methods such as planting.

5) Transportation and Pedestrian – improving the quality of Thailand's existing public transportation can attract more people to use it. Public transportation on the ground is plagued by the critical issues of traffic congestion and time management. On the ground, public transit should only consider bus lanes in order to effectively manage journey time and build transportation software for real-time bus location tracking. The issue with motorbikes and tuk-tuk is their unpredictable payment expenses; this mode of public transportation should calculate the rate and cost based on distance and time. For the sake of travel convenience, BTS and MRT

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can grow further into other Bangkok neighborhoods. To create a seamless community, the development should take into account the transit and station quality and facility in order to increase the usage of public transportation in the area.

6) Pollution Control and Management – Public physical action, as opposed to relying solely on human labor, can ensure the reduction of air and water pollution. By utilizing clean energy and providing a natural solution for pollution removal, carbon-generating activities can be avoided. To promote the use of clean energy, provide public electric vehicles on the street and encourage the use of alternative modes of transportation (bike sharing, scooter sharing, EV car sharing). As a natural approach for pollution purification, increasing green space for air pollution and constructing a water filtration system are recommended.

7) Encourage Social Interaction and Activity – to encourage social connection and activity, the public urban environment should provide indoor and outdoor interaction area or design space to enhance activity. For interior contact, the development may include coworking space. For outdoor space, the development should take into account the physical form of a public facility that might encourage social activities, such as public plazas, walking streets, street furniture, etc.

8) Social Insecurity Service and Support – To improve the physical state of the Silom-Sathorn neighborhood for all demographics. Both public and private facilities should consider universal design.

9) Reducing Economic Stress and Affordable – The Silom-Sathorn neighborhood should include inexpensive creative space, public entertainment facilities, stress-reduction activities, and other resources. For cheap facilities such as food and beverages, public infrastructure should be designed with street vendors in mind to avoid the problem of obstructed walkways. Included in design development are public art, public creativity space, entertainment kiosks, street vendor space, etc.

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Table 4.6

Urban strategy solution for development

	Current Urban Issue	Problem Solving Solution
Access to nature	- The quantity of green space in the Bang Rak district is below the WHO recommended. - Public green spaces lack care and are non-functional and inaccessible to water resources. - Uncertain growth of public open space (physical disconnected streetscape development) - The majority of green space is privately owned, inaccessible, and undeveloped.	- Bringing the area's green space up to the WHO's minimum recommendation - It is essential that public green space be properly maintained and strictly governed - Green features should be incorporated into public infrastructure in order to make it more accessible to the general public. - Considering the regulation management of public green development to promote specific green space development - Through policies and incentives, encourage the creation of private green space.
Active and Exercise	- In terms of physical condition and on-the-ground activity, the urban characteristics and physical state of street pedestrians in the vicinity of BTS Saint Louis station on N. Sathorn Road cannot improve walkability. - Streetscape design does not consider other ground-based activities (cycling, scooter, skateboard, street vendor) - The majority of sport and exercise facilities are privately owned and not free.	- Considering the standard regulatory design of public infrastructure to enhance the physical quality and facility, promote on-ground social engagement, and increase the area's walkability - Including both motor and non-motor activity facilities on the ground (cycling, scooter, skateboard, street vendor) - Considering the sport and exercise facility for development of the public realm
Safety Management	- Dangerous for street crossing with the broad alley or road at N. Sathorn road - N. Sathorn road lacks ground-level activity (lack of eyes on street) - Difficulty in obtaining BMA CCTV images (CCTV is unfunctional) - Private hospitals are very pricey. - Problems with the homeless and blind areas on BTS railways	- Taking into consideration the law and regulatory design for safety environment, including standard street design and safety facility, - Enhance ground-level activity by implementing streetscape design (quality and facility) - Considering the creation of a new CCTV system - New alternative treatment methods - Considering the design for cheap homes
Sensory Management	- Sensory management control in the Silom-Sathorn area is reliant on human effort; there is no viable method for pollution prevention or treatment (light, noise, smell) - acoustic disturbances from traffic and ground activity - obscurity and blind zone beneath the BTS railway - Air pollution, water pollution, and trash-related odor pollution	- Utilizing technology to prevent and minimize pollution in the area is a viable approach to a sustainable sensory management solution. - Providing a green barrier design to prevent external noise from entering an interior space (noise regulation control) - Controlling lighting regulation - Utilizing technology and natural solutions for pollution control

Table 4.6

Urban strategy solution for development (Cont.)

Transportation and Pedestrian	Current Urban Issue - Many of people choosing private vehicle rather than public transportation - High volume of traffic congestion - Uncertain time travelling on ground - Streetscape is unstable development (private develop public space in front of their property) - Bad pedestrian condition and lacking on ground activity can not encourage walkability	Problem Solving Solution - Improving the quality of public transportation or advocating a campaign to increase the use of public transportation through the provision of alternative routes and modes of transport, effective time management, and consideration of the design regulations for public transit hubs. - Considering the design regulation to construct streetscape design to enhance the area's quality and promote walkability
Pollution Control and Management	Current Urban Issue - Lacking of sustainable solution for toxic pollution management in the area - High number user of private vehicle and traffic congestion that conducted air pollution - Littering problem	Problem Solving Solution - Utilizing technology to prevent and minimize pollution in the area is a viable approach to a sustainable toxic management solution. - Promote clean energy using - Regulation control for littering
Encourage Social interaction and Activity	Current Urban Issue - No physical design to encourage interaction on public outdoor space.	Problem Solving Solution - Providing outside interaction space and activity by utilizing public space for temperate events or by installing outdoor creative street furniture to boost activity in the area.
Social Insecurity Service and Support	Current Urban Issue - Lacking of service and support for vulnerable people - Universal design is not provided on street and public transportation on ground	Problem Solving Solution - Taking into consideration the design regulation for the universal design element and the stringent requirements for every facility.
Reducing Economic Stress and Affordable	Current Urban Issue - Most of facility in the area have high price and expensive - BTS and MRT are expensive - Lacking of affordable price accommodation	Problem Solving Solution - Supporting local businesses in the region through the provision of specialized area or event - Taking into consideration the creation of affordable housing and regulatory incentives to promote development - Considering the typical fare across all modes of public transportation

Design Development of Typology A

In the area of typology A, the development of the streetscape design will prioritize both ground-level and skywalk pedestrians in order to integrate natural space and social activity. The reason for focusing on both the ground and the skywalk is user behavior in the area. Using a public urban element that is freely available to everybody, the initial idea of the thesis seeks to create the urban environment so as to promote a better mental state by incorporating a public urban element. Typology A is characterized by a high density of on-ground activity, with the majority of users utilizing public pedestrian and ground amenities. The urban element development

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should prioritize the pedestrian network development, which is the public amenity that users in the region primarily use and utilize.

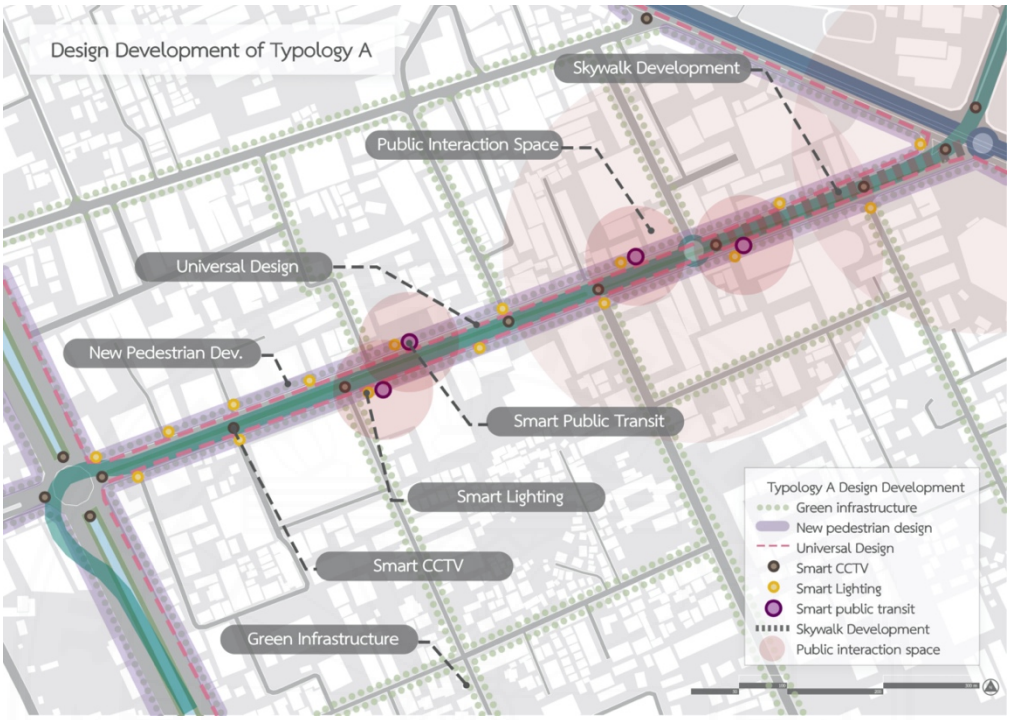


Figure 4.13 Design development of typology A

O Streetscape development to integrate green space to public infrastructure on the ground and pedestrian skywalk

O Pedestrian walkways are design considering various types of activity on the ground and skywalk (motor and non-motor activity - walking, cycling, skateboard, longboard, scooter, etc.)

O Public open space and street furniture design for social interaction on-ground and skywalk (public plaza, walking street, street furniture, public transit nodes, etc.)

O Pedestrian design considering space for street vendors

O Smart lighting system

O Smart CCTV security system with an application to access the data footage

O Universal design facility (public infrastructure – pavement, public transportation system, etc.)

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- Smart bus and bus lane (EV, application, smart bus station)
- Public smart box (WIFI station, charging station, public toilet, etc.)

Design Development of Typology B

The design development for typology B would concentrate on skywalk pedestrian walkways connecting to BTS stations in order to create a stress-relieving environment and activities for all. Typology B is distinguished by the location of the skywalk connecting the public transportation hub to the office district. The majority of the area's users are pedestrians who utilize the skywalk to pass through without engaging in any activity. Environmental development for skywalk pedestrians should be the primary emphasis of the design development. To establish a stress-relieving environment and activity on this public plaza, the neighborhood should also consider offering the facilities and activity.

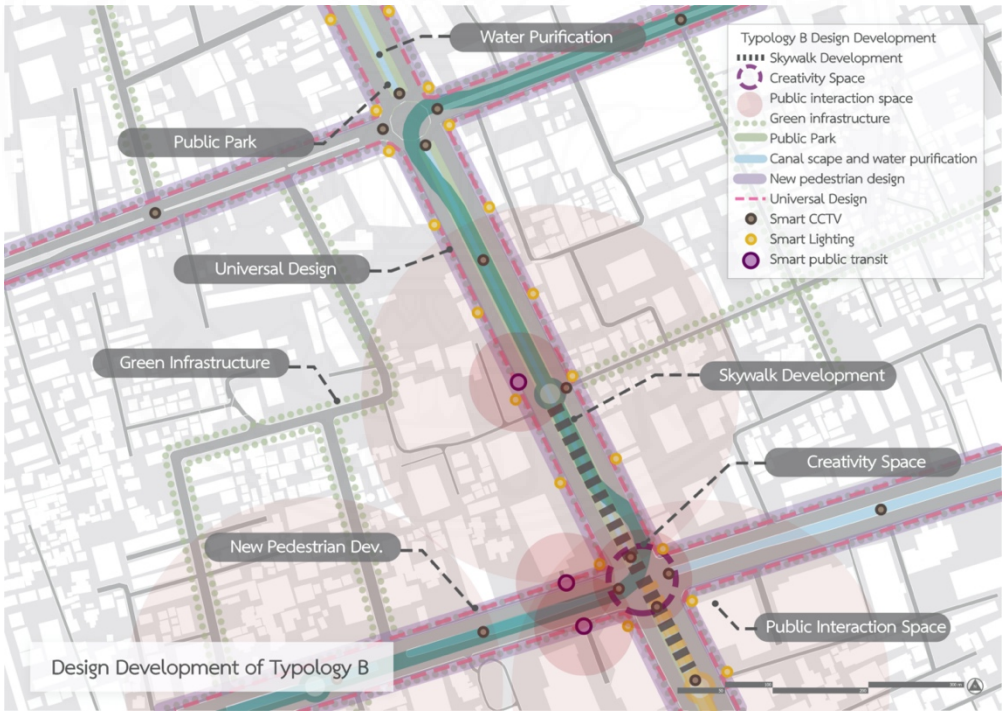


Figure 4.14 Design development of typology B

- Integrated green space to public infrastructure on Chong Nonsi Skywalk, providing horizontal and vertical garden

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- Creativity space and design on public plaza to enhance social interaction and stress reducing activity (Street performance, activity event area, relaxing space)
- Providing space for street vendor
- Universal design provided

Design Development of Typology C

In the Typology C area, the design development would concentrate on public feeder development (motorcycle and bus station) and enhancing the on-ground services given to increase street activity. Typology C is characterized by a lack of activity on the ground, but a high level of activity on public feeder services, particularly motorbike service. The development should focus on enhancing the urban facility of public transportation and feeder to support the behavior of the area's inhabitants. In addition to evaluating ground facility to stimulate use and activity on the street.

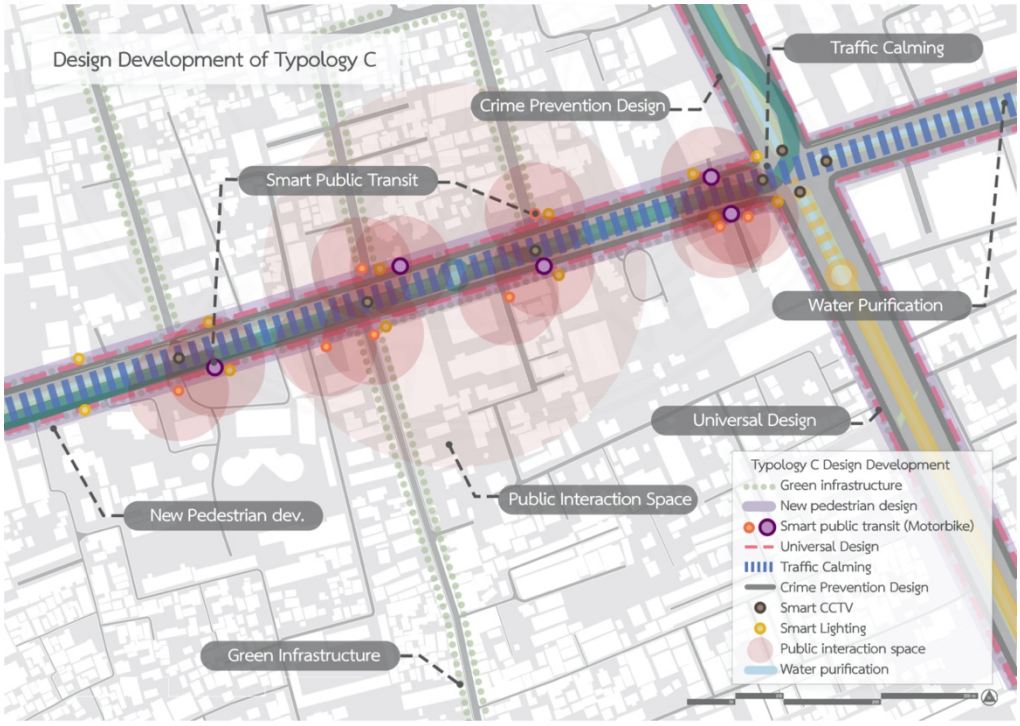


Figure 4.15 Design development of typology C

- Design proper location of public transit (motorbike and tuk-tuk)

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- Promote Electric vehicle and smart payment system
- Smart bus and bus lane (EV, application, smart bus station)
- Public smart box (WIFI station, charging station, public toilet, etc.)
- Develop pedestrian quality (streetscape design for all activity)
- Universal design provided
- Urban street furniture

4.4.2 Applying Public Policy Instrument

Policy instruments are a tool employed by governing authorities to promote a policy for the purpose of achieving defined objectives. Implementing the instrument of public policy to increase the achievement of the policies through five primary instruments: Regulative Instruments, Market-Based Instruments, Procedural Instruments, Institutional Instrument, and public awareness campaigns.

1) Regulative Instruments – policy instruments that are provided in form of law and regulation, this type of instrument is called a command-and-control instrument. This type of instrument must follow the order.

2) Market-Based Instruments (Incentive) – this policy instrument is provided for motivation and attracts people to follow the policy, with no punishment for not following. The benefit return is in form of economic benefit.

3) Procedural Instruments – this instrument is used for evaluating the achievement of the project, the instrument is in form of evaluation and indicators.

4) Institutional Instruments – policy instrument that collaboration working between the public and private sector, Public-Private Participation (PPP)

5) Public awareness campaign – the process of building public recognition by communication tactics, targeting a large number of people to generate specific outcomes.

Utilizing the public policy instruments in the Silom-Sathorn area can encourage the development process to reach the desired outcomes. In order to promote the Silom-Sathorn neighborhood, the following policies and regulations are presented as ideas for Thailand's public policy. The selection of the policies and regulations was based on the urban performance prompted by the policies and regulations.

Ref. code: 25656316123063BUO

Regulative Instrument

(1) Parks and Trees Act (Singapore, 2005) – the planting, maintenance, and conservation act of trees and plants

a. Part 4 - Conservation of trees and plants
    i. Division 1 – Tree conservation areas and vacant lands
b. Part 5 – Planting areas, public open spaces, and green verges
    i. Division 1 – Planting areas and streetscapes
    ii. Division 2 – Open spaces set aside as public parks
    iii. Division 3 – Green verges
    iv. Division 4 – Specifications and approvals
c. Part 6 – Prevention of dangers
d. Part 8 – Offences, penalties, and proceedings

(2) Air Pollution Control Act 1968 (Japan, 2017) – air pollution act to protect health and living environment from air pollution

a. Chapter 2-1 – Regulation of Soot and Smoke Emissions
b. Chapter 2-2 – Volatile Organic Compound Emissions
c. Chapter 2-3 – Regulation of Particulates
d. Chapter 3 – Maximum Permissible Limits of Automobile Exhaust
e. Chapter 4 – Monitoring of Air Pollution Levels
f. Chapter 6 – Penal Provisions

(3) Water Pollution Prevention Act 1970 (Japan, 2016)

a. Chapter 2 – Regulations on Discharging Effluent
b. Chapter 3 – Monitoring the Status of Water Pollution
c. Chapter 6 – Penal Provisions

(4) Noise Regulation Law 1968 (Japan, 2000)

a. Chapter 4 – Maximum Permissible Levels of Motor Vehicle
    i. Establish the maximum permissible levels of noise produced by motor vehicles

(5) The Law for Promoting Easy Mobility and Accessibility for the Aged and Disabled (Japan, 2006) – the law provided for developing barrier-free environments at public spaces and public transportation hubs

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a. Standards compliance obligation and applicable
    i. Public transport operators
    ii. Road administrators
    iii. Off-road parking space administrators
    iv. Traffic safety standards
    v. Parking administrators
    vi. Building standards

(6) Action Plan to Create A Crime-Resistant Society (Japan, 2003) – action plan to support crime prevention activities and develop a secure society against crime

a. Part 1 – Prevention of Crimes which are Committed in Familiar Places and Threaten Peaceful Life
    i. Regeneration of community solidarity and creation to safe and peaceful communities
    ii. Diffusion of products and systems effective for crime prevention
a. Part 4 - Protection of Economy and Society from Organized Crime
    i. Realization of a society without drug abuse and firearms offenses
    i. Establishment of infrastructure for public safety

(7) Singapore Green Plan 2030 – national target to achieve long-term net zero emission

a. City in Nature
    i. Increase green spaces
    ii. Support biodiversity to live in harmony
b. Energy Reset
    i. Solar energy development
    ii. 80 percentages of building turn green
    iii. Urban setting for electric vehicles (EVs)
c. Green Economy

Ref. code: 25656316123063BUO

d. Resilient Future

e. Sustainable Living

i. Reduce waste and recycling

ii. Encourage walking, cycling, and active mobility

Market – Based Instrument

(1) Green Mark Incentive Schemes (Singapore, 2005) – incentive for adopting environmentally friendly building technologies and design practices

a. Green Mark Incentive Scheme for Existing Building (2022)

i. Incentive to lower the upfront cost of energy efficiency retrofit for building that achieve higher energy performance standard (Green Mark Platinum, Green Mark Super Low Energy, Green Mark Zero Energy)

b. Built Environment Transformation Gross Floor Area Incentive Scheme (2021)

i. Delivering Industry Transformation Map (ITM) outcomes requirements on private development project (at least 5,000 square meters of GFA) get additional up to 3 percentages of Gross Floor Area (GFA)

c. Building Retrofit Energy Efficiency Financing (2011)

i. Financial support options for upfront cost of energy

(2) Skyrise Greenery Incentive Scheme (Singapore, 2009) – incentive for increasing greenery in Singapore by funding up to 50 percentages of installation costs of vertical and rooftop greenery

a. Encourage skyrise greenery installation

b. Reduce urban heat island effect

c. Improve air quality

(3) Community and Sport Facilities Scheme (Singapore, 2003) – integrating community facilities to commercial development

a. GFA bonus for providing community and sport facilities with highly accessible to commercial area

(4) Indoor Recreation Space Incentive (Singapore) – indoor recreation space development in private non-residential and residential development

a. GFA bonus for providing indoor recreation space

Ref. code: 25656316123063BUO

Procedural Instrument

(1) Environmental evaluation for mental health – providing the new evaluation criteria for evaluating physical condition and performance of urban elements that influence mental condition

a. Green-blue infrastructure evaluation
b. Sport and exercise facility evaluation
c. Safety management evaluation
d. Sensory management evaluation
e. Transportation and pedestrian infrastructure evaluation
f. Pollution control evaluation
g. Public recreation space evaluation
h. Universal design infrastructure evaluation
i. Stress reduction facilities evaluation

Institute Instrument

(1) Community engagement – community engagement for public facility provided in the community area

a. Green space project in community
b. Sport and exercise facility in community
c. Affordable housing and facility in community

(2) Private Public Partnership – project development which arrangement between public and private sectors (public park project, public transport project, etc.)

a. Urban public park project
b. Skywalk pedestrian development project
c. Affordable housing project

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Public Awareness Campaign

(1) Garden City Program (Singapore, 1963) - intensive tree planting program to create greenery city and clean environment in order to improve well-being of the people

a. Planting in built-up areas
b. Roadside tree planting
c. Natural reserves and core protected are

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CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

In order to provide an answer to the research question of “Environmental Design for Mental Health: a Case Study of Silom-Sathorn Neighborhood” on the urban element quality and how to design urban environments that can improve mental condition, a case study of the neighborhood of Silom-Sathorn was conducted. If an urban element is going to be designed successfully, it must take into consideration development on functional, accessible, active, and affordable aspects. This will ensure that the urban element will have the greatest positive impact possible on improving mental health. The appropriate urban environmental design for a post-pandemic situation should take into account the existing urban characteristics, the present urban issues of the area, and the development of planning for the solution of the existing problem in a way that enhances the identity of the place.

For the purpose of improving people' mental health, the environment that was developed in the Silom-Sathorn area has been categorized into three distinct typologies. Typology A places an emphasis on ground-level pedestrian development and activity as a result of the bustling and high-density activity that already exists on the street. Typology B focuses on the development of pedestrian skywalks as a stress-relieving facility and activity due to the enhancement of the therapeutic effects of the public skywalks that are already in place. Typology C: Concentrating efforts to increase the amount of activity taking place on the ground in order to improve public safety and the growth of public transit; at the same time, halting the process of designing streetscapes.

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To create the urban environment in Thailand, particularly in the Silom-Sathorn district, in a way that can influence mental health is likely to develop based on the presence of a transit station, skywalk pedestrian walkway, green recreation space, and interior interaction space. People in Thailand spend more time indoors than outside, and the only public open spaces that have high potential for development in environmental design for mental health are transit stations, pedestrian walkways, and green recreation spaces. However, people in Thailand prefer to spend their time indoors.

5.2 Recommendation

It's possible that the outcome of the thesis is not reasonable in some aspects; there are a lot of gaps and pieces of material that are missing that could help support the concept of the new environmental guideline. For additional research on the relationship between the built environment and mental health, see, to begin, I would like to investigate the ways in which urban characteristics in European cities and Asian cities are similar to and different from one another in order to arrive at a workable solution that can be applied to both sets of cities. This thesis, thesis employs a method associated with mental health and applies it in an Asian city, which has the potential to cause misunderstanding and lead to an irrational result. When it comes to developing new guidelines, having an understanding of the distinct urban characteristics of both European and Asian cities can help make the process more reasonable.

Secondly, in order to support my proposal of producing new environmental design guidelines for mental health, I would like to collect further information as well as thoughts and recommendations from professionals working in fields that are linked to those fields. My thesis does not make sufficient sense because the current outcome, which was produced without the benefit of a professional perspective, is deficient in a great many areas.

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Thirdly, I would like to experiment with a variety of tools and approaches to see if I can come up with a version of the new environmental design for mental health that is more realistic.

Even if the results of the thesis don't meet my expectations, this is a solid foundation on which to build an investigation into the connection between the built environment and psychological well-being.

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REFERENCES

Books

Litman, T. (2022). *Urban Sanity: Understanding Urban Mental Health Impact and How to Create Saner, Happier Cities*. Canada: Victoria Transport Policy Institute

Roe, J. McCay, L. (2021). *The Restorative City: Urban Design for Mental Health and Wellbeing*. England: Bloomsbury Publishing Plc

Online Articles

Bangkok from Department of Environment and Department of Strategy and Evaluation. (2022). *Green Space In Bangkok*. Retrieved July 10, 2022 from http://203.155.220.118/green-parks-admin/reports/report19.php?park_year=2564&rang1=2556&rang2=2564

Building and Construction Authority. (2022). *Green Mark Incentive Schemes*. Retrieved July 10, 2022 from https://www1.bca.gov.sg/buildsg/sustainability/green-mark-incentive-schemes

Green Plan. (2022). *Singapore Green Plan 2030*. Retrieved July 10, 2022 from https://www.greenplan.gov.sg/key-focus-areas/overview

Gruebner, O. Rapp, M A. Adli, M. Kluge, U. Galea, S. Heinz, A. (2017). *Cities And Mental Health.* Retrieved May 15, 2022 from https://www.aerzteblatt.de/int/archive/article?id=186433

Mccay, L. Lai, L. (2018). *Urban Design And Mental Health In Hong Kong.* Journal of Urban Design and Mental health 2018. Retrieved May 15, 2022 from https://www.urbandesignmentalhealth.com/journal4-hk-case-study.html

Mccay, L. Suzuki, E. Chang, A. (2017). *Urban Design And Mental Health In Tokyo.* Journal of Urban Design and Mental Health 2017. Retrieved May 15, 2022 from https://www.urbandesignmentalhealth.com/journal-3---tokyo-case-study.html

Ref. code: 25656316123063BUO

Ministry of the Environment Government of Japan. (1999). *Noise Regulation Law.* Retrieved July 10, 2022 from https://www.env.go.jp/en/laws/air/noise/ch.html#ch4

Singapore Statues Online. (2022). *Park And Tree Act 2005.* Retrieved July 10, 2022 from https://sso.agc.gov.sg/Act/PTA2005

Skyrise Greenery. (2009). *Skyrise Greenery Incentive Scheme 2.0*. Retrieved July 10, 2022 from https://www.nparks.gov.sg/skyrisegreenery/incentive-scheme

The World Happiness Report. (2021). *The World Happiness Report 2021*. Retrieved May 15, 2022 from https://worldhappiness.report/ed/2021/

Tokyo University. (2006). *Barrier Free Law in Japan*. Retrieved July 10, 2022 from https://www.google.co.th/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiryvDtveb4AhUBxDgGHeVAAZQQFnoECAMQAQ&url=https%3A%2F%2Fwww.mhlw.go.jp%2Ffile%2F06-Seisakujouhou-10500000-Daijinkanboukokusaika%2F0000064234.pdf&usg=AOvVaw2qUXueLA4doGwnngTL_p5v

Urban Redevelopment Authority. (2022). *Bonus GFA Incentive Scheme*. Retrieved July 10, 2022 from https://www.ura.gov.sg/Corporate/Guidelines/Development-Control/Non-Residential/Commercial/GFA-Incentive-Schemes

Electronic Media

Britannica. (2021). *Tokyo.* Retrieved May 15, 2022 from https://www.britannica.com/place/Tokyo

GOV UK. (2020). *Hong Kong*. Retrieved May 15, 2022 from https://www.gov.uk/foreign-travel-advice/hong-kong/safety-and-security

GovHK. (2022). *Air Pollution In Hong Kong*. Retrieved May 15, 2022 from https://www.gov.hk/en/residents/environment/air/airquality.htm

Japanese Law Translation. (2017). *Air Pollution Control Act*. Retrieved July 10, 2022 from https://www.japaneselawtranslation.go.jp/en/laws/view/3561

Japanese Law Translation. (2016). *Water Pollution Prevention Act.* Retrieved July 10, 2022 from https://www.japaneselawtranslation.go.jp/en/laws/view/2815/en

Ref. code: 25656316123063BUO

Mental Health Gov (2022). *What Is Mental Health*. Retrieved May 15, 2022 from https://www.mentalhealth.gov/basics/what-is-mental-health

Mind HK. (2019). *Press Release: World Mental Health Day*. Retrieved May 15, 2022 from https://www.mind.org.hk/press-releases/wmhd2019/

National Archives Singapore. (2021). *Garden City.* Retrieved July 10, 2022 from https://www.nas.gov.sg/archivesonline/blastfromthepast/gardencity

National Geographic Society. (2011). *Urban Area*. Retrieved May 15, 2022 from https://www.nationalgeographic.org/encyclopedia/urban-area/

The Centre for Urban Design and Mental Health. (2022). *How Urban Design Can Impact Mental Health.* Retrieved May 15, 2022 from https://www.urbandesignmentalhealth.com/how-urban-design-can-impact-mental-health.html

Urban Design and Mental Health. (2022). *How the City Affects Mental Health.* Retrieved May 15, 2022 from https://www.urbandesignmentalhealth.com/how-urban-design-can-impact-mental-health.html

WHO. (2018). *Mental Health: Strengthening Our Response*. Retrieved May 15, 2022 from https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

Wikipedia. (2022). *Bang Rak District*. Retrieved May 15, 2022 from https://th.wikipedia.org/wiki/

Wikipedia. (2022). *Sathorn District*. Retrieved May 15, 2022 from https://th.wikipedia.org/wiki/

Wikipedia. (2022). *Silom Road*. Retrieved May 15, 2022 from https://th.wikipedia.org/wiki/

Wikipedia. (2020). *Suicide In Japan*. Retrieved May 15, 2022 from https://en.wikipedia.org/wiki/Suicide_in_Japan

Wikipedia. (2022). *Tokyo*. Retrieved May 15, 2022 from https://en.wikipedia.org/wiki/Tokyo

Ref. code: 25656316123063BUO

Worldmeters. (2022). *Hong Kong Population*. Retrieved May 15, 2022 from https://www.worldometers.info/world-population/china-hong-kong-sar-population/

World Population Review. (2022). *Tokyo Population*. Retrieved May 15, 2022 from https://worldpopulationreview.com/world-cities/tokyo-population

Ref. code: 25656316123063BUO

APPENDICES

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APPENDIX A

GREEN SPACES IN BANG RAK DISTRICT

Source: Bangkok from Department of Environment and Department of Strategy and Evaluation

Table A.1

Public green space in Bang Rak District

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
1	Wat Hua Lamphong	Vacant		2	62.7	unfunctional	no	Public
2	5 Naret Road	Farming			80	functional	yes	Public
3	Rama IV Road	Streetscape		3		functional	yes	Public
4	Pan Road	Streetscape			34	functional	yes	Public
5	Sep Road	Streetscape			79	functional	yes	Public
6	Naret Road	Streetscape			64	functional	yes	Public
7	Charun Wiang Road	Streetscape			16	functional	yes	Public
8	Sideway Pramoan Road	Streetscape			16	functional	yes	Public
9	Silom soi 9	Streetscape			18	functional	yes	Public
10	Sala Daeng Road	Streetscape		1	48	functional	yes	Public
11	Si Phraya Road	Streetscape		2	48	functional	yes	Public
12	Charoen Krung Road (Bang Rak-Saphan Tip Satian)	Streetscape		1	10	functional	yes	Public
13	Decho Road	Streetscape			43	functional	yes	Public
14	Charoen Krung soi 47/3	Streetscape			27	functional	yes	Public
15	Soi Pramod Surawong Road	Streetscape			19	functional	yes	Public
16	Soi Anuman Rajdhon	Streetscape			56	functional	yes	Public
17	Sathorn soi 10	Streetscape			45	functional	yes	Public
18	Charoen Krung soi 42/1	Streetscape			21	functional	yes	Public
19	Sathorn soi 6	Streetscape			3	functional	yes	Public
20	Sathorn soi 12	Streetscape			63	functional	yes	Public
21	Sidewalk Park Convent Road	Streetscape			87	functional	yes	Public
22	Silom Road	Streetscape		2	48	functional	yes	Public
23	Sathorn soi 4	Streetscape			25	functional	yes	Public
24	Sri Wieng Road	Streetscape			85	functional	yes	Public
25	Sidewalk Park Surawong Road	Streetscape		1	68	functional	yes	Public
26	Surasuk-Mahanakorn Road	Streetscape		2	73	functional	yes	Public
27	Sathorn soi 2	Streetscape			23	functional	yes	Public
28	Space next to Khlong Hua Lamphong	Canalscape		2	50	functional	yes	Public
29	Wat Maha Phruettharam Pocket Park	Pocket park			5	Functional	no	Public
30	Sidewalk Park Naradhiwas Rajanagarindra Road	Streetscape			25.25	Functional	yes	Public
31	BTS Silom	Streetscape			90	Functional	no	Public
32	Exit area of Silom expressway	Streetscape			19.5	Functional	yes	Public
33	Chong Nonsi Canalscape Park	Streetscape			62	Functional	yes	Public
34	Sidewalk Park Surawong Road	Streetscape			56.5	Functional	yes	Public
35	Sidewalk Park Silom Road	Streetscape			85	Functional	yes	Public
36	Sidewalk Park Chroen Krung Road	Streetscape			67.47	Functional	yes	Public
37	Pocket Park at the exit of Silom expressways	Pocket park			89	Functional	no	Public
38	Samyan Pocket Park (Si Phraya Intersection)	Pocket park		1	17	Functional	yes	Public
39	Pocket Park at entrance way of expressway	Streetscape			20.25	Functional	no	Public
40	Traffic Island under the expressway	Streetscape		2	11	Functional	yes	Public
41	District Administration Office Pocket Park	Pocket park			22.5	Functional	no	Public
42	Samyan Pocket Park (Police Office)	Pocket park			2.75	Functional	yes	Public
43	MRT Hua Lamphong Pocket Park	Streetscape			3.5	Functional	yes	Public
44	N. Sathorn Park	Streetscape			78.5	Functional	yes	Public
45	Sidewalk Park Rama IV road	Streetscape		1	64.93	Functional	yes	Public
46	Traffic Island Silom Road	Streetscape	1	3	50	Functional	no	Public
47	Maha Phruettharam Park	Public park		2	17.25	Functional	yes	Public
48	Maha Set Park	Streetscape		2	59.37	Functional	yes	Public
49	Mahanakorn Park	Streetscape			10.88	Functional	yes	Public
50	Withayu Pocket Park	Streetscape			9	Functional	no	Public
	Total	20713.4	1	27	2078.35			
		Sq.m						

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Table A.2

Private green space in Bang Rak District

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
	Private Sector							
1	Sam's Fish & Chips	Pocket park		1	32	functional	yes	semi-private
2	Divana Virtue Spa	Pocket park		3	30	functional	yes	semi-private
3	The Room Sathorn	Pocket park		1	25	functional	yes	Private
4	Life @ Sathorn10	Pocket park		2	85	functional	yes	Private
5	Dusit Central Park	Vertical garden			321.5	functional	no	Private
6	35 Sathorn soi 6	Pocket park			15	functional	no	Private
7	Ruen Noppagao	Pocket park			57.5	functional	yes	Semi-private
8	Brasserie 9	Pocket park			47	functional	yes	Semi-private
9	Samyan Business Town	Pocket park			114.63	functional	yes	Private
10	232/74 Naret road	Vacant			20	Unfunctional	no	Private
11	11-6 Silom soi 13	Vacant		1		Unfunctional	no	Private
12	Space next to Burachai Ice	Vacant		2		functional	yes	Private
13	130/4 N. Sathorn soi 14	Pocket park			20	functional	no	Private
14	Beauty Gems	Pocket park			60	functional	yes	Private
15	118/1-3 Soi Sala Daeng	Pocket park	1			functional	yes	Private
16	Dyntecture Company	Streetscape			30	functional	yes	Private
17	Silom Serene Hotel	Pocket park			30	functional	yes	Semi-private
18	Thailand Privilege Card	Private park		2	30	functional	yes	Private
19	Sampoom Garden	Pocket park		1		functional	yes	Private
20	126/1 N. Sathorn soi 14	Pocket park			15	functional	no	Private
21	Altitude	Vertical garden		1		functional	no	Private
22	Space next to 385 Charoen Krung road	Vacant		1	50	Unfunctional	no	Private
23	1 Si Phraya road	Pocket park	1	3		functional	yes	Private
24	Space next to 563 Si Phraya road	Vacant		1		functional	yes	Private
25	68 Si Phraya road	Vacant			50	functional	yes	Private
26	Space next to 132 Maha Set road	Vacant			30	Unfunctional	no	Private
27	48/1 Suk San road	Vacant			50	Unfunctional	no	Private
28	Space next to Red Planet	Vacant			20	Unfunctional	no	Private
29	Space next to 30 Convent road	Vacant		1		Unfunctional	no	Private
30	Space next to 991 Charoen Krung road	Vacant		1		Unfunctional	no	Private
31	Space next to 122 - 124 Sathorn soi 12	Vacant			50	Unfunctional	no	Private
32	Space next to 389 Sawang soi 7	Vacant		1		Unfunctional	no	Private
33	190/1 Soi Saphan Yap	Vacant			50	Unfunctional	no	Private
34	Prusa Real Estate	Pocket park			50	functional	yes	Private
35	ITF	Pocket park			50	functional	yes	Private
36	Supalai Elite	Pocket park		1		functional	yes	Semi-private
37	Space next to 286 Soi Song Phra	Vacant		1		Unfunctional	no	Private
38	Aston Silom	Pocket park		2		functional	yes	Private
39	Space next to Jane Hay's Memory School	Vacant			50	Unfunctional	no	Private
40	52/25 Pan road	Vacant		3		functional	yes	Private
41	385 Soi Song Phra	Vacant	1	2		Unfunctional	no	Private
42	Space next to 119-121 Mahapluetharam road	Vacant			20	Unfunctional	no	Private
43	85-89 Soi Phet Phloi	Vacant			50	Unfunctional	no	Private
44	Space next to 336 Rama IV road	Vacant	3			Unfunctional	no	Private
45	The Line Sathorn	Pocket park			55	functional	yes	Private
46	Noble	Pocket park		2		functional	yes	Private
47	110 - 110/3 Sala Daeng road	Pocket park		1		functional	yes	Private
48	120/2 Sala Dang road	Pocket park		1		functional	yes	Private
49	Space next to 1010/9-11 Rama IV road	Vacant	1			underconstrcution		
50	Aston Rama IV road	Pocket park	2			functional	yes	Semi-private

Table A.2

Private green space in Bang Rak District (Cont.)

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
51	Thai Samut Building	Pocket park		2		functional	no	Private
52	Space next to 593/10 Soi Song Phra	Vacant			5	Unfunctional	no	Private
53	Saladeng One	Pocket park		2	50	functional	yes	Semi-private
54	Space next to 95 Soi Sawang	Vacant		1		Unfunctional	no	Private
55	Space next to Embassy of Russia	Vacant		1	50	functional	yes	Semi-private
56	Carmelite Monastery Bangkok	Private park	2			functional	yes	Private
57	Kbank N. Sathorn soi 2	Streetscape		1		functional	yes	Semi-private
58	Plan Toys	Pocket park			50	functional	yes	Private
59	Manora Hotel	Pocket park		2		functional	yes	Semi-private
60	Marriott Hotel	Pocket park		2		functional	yes	Semi-private
61	TCDC	Private park	1	5		functional	yes	Semi-private
62	9-9/1-2 Soi Wat Suan Phlu	Pocket park			10	functional	yes	Semi-private
63	3/11-12 Decho road	Pocket park			50	Unfunctional	no	Private
64	291 Surawong road	Pocket park			30	functional	yes	Semi-private
65	295-36-38 Surawong road	Streetscape			10	functional	yes	Semi-private
66	Space next to Evergreen Hotel	Vacant		1		functional	yes	Private
67	Space next to 33-33/1 Sathorn soi 6	Vacant	1			functional	yes	Semi-private
68	TTB Thanachart Surawong road	Streetscape			40	functional	yes	Semi-private
69	Space next to 66 Charoen Krung road	Vacant			40	Unfunctional	no	Private
70	Siri Silom	Pocket park		1	50	functional	no	Private
71	Suebsamphanthawong Church	Pocket park		2		functional	yes	Private
72	64 Pan road	Pocket park		1	10	functional	yes	Semi-private
73	Space next to Progress Land Mark	Vacant		1		Unfunctional	no	Private
74	Space next to 31/13 Charoen Krung soi 39	Vacant		1		Unfunctional	no	Private
75	Space next to 15 Charat Wiang road	Vacant		1		Unfunctional	no	Private
76	Space next to 133/1 Sri Wiang road	Vacant		4	50	functional	yes	Private
77	Bussaracum Royal Thai Cuisine	Pocket park		1		functional	yes	Semi-private
78	64/1-2 Pan road	Pocket park		1		functional	yes	Semi-private
79	532 Si Phraya road	Vacant			80	Unfunctional	no	Semi-private
80	Space next to 95-97 Phet Phloi road	Vacant			35	Unfunctional	no	Private
81	Nawarat Mansion	Pocket park		2		functional	yes	Private
82	Chartered Square	Pocket park			30	functional	yes	Semi-private
83	Tanida Residence	Pocket park			80	functional	yes	Private
84	58 Soi Pramot	Vacant		1		Unfunctional	no	Private
85	288-288/1-9 Surawong road	Streetscape			20	functional	yes	Semi-private
86	14 Soi Nom Chit	Vacant		1		Unfunctional	no	Private
87	79/2-8 Sap road	Pocket park		3		functional	yes	Private
88	Space next to 36/4 Sri Wiang road	Vacant		1	5	Unfunctional	no	Private
89	United Center Building	Pocket park	1			functional	yes	Private
90	Lerdsin Hospital	Pocket park		2	70	functional	yes	Private
91	116 Sala Daeng road	Private park	1			functional	yes	Private
92	25 Sala Daeng road	Pocket park			50	functional	yes	Private
93	19/1-18 Saladang Executive	Pocket park		1		functional	yes	Private
94	Sri Maha Mariamman Temple	Pocket park			20	functional	yes	Private
95	The Room Charoen Krung road	Pocket park		1		functional	yes	Semi-private
96	Thai Sip 248	Streetscape			20	functional	yes	Semi-private
97	156 Phiphat soi 2	Vacant		1		Unfunctional	no	Private
98	63 Soi Phiphat	Vacant		1	60	Unfunctional	no	Private
99	2/2 Silom soi 13	Vacant		1		Unfunctional	no	Private
100	21/1 Sala Daeng road	Streetscape		1		functional	yes	Semi-private

Table A.2

Private green space in Bang Rak District (Cont.)

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
101	92 Soi Pradit	Pocket park			20	functional	yes	Private
102	102 Soi Chalong Krung	Vacant			20	Unfunctional	no	Private
103	981 Silom road	Pocket park		2		functional	yes	Private
104	481-491 Si Phraya road	Vacant		3		Unfunctional	no	Private
105	60-62/1 Silom soi 13	Vacant		1		Unfunctional	no	Private
106	Arama Surawong road	Pocket park		1	90	Functional	Yes	Private
107	273 Soi Saphan Yao	Pocket park		2		Functional	Yes	Private
108	150/2 Naradhiwas Rajanagarindra road	Pocket park		1		Functional	Yes	Private
109	isanook Building	Streetscape			5	Functional	Yes	Semi-private
110	Sethiwan Tower	Vertical garden			10	Functional	No	Private
111	UOB Building	Streetscape			5	Functional	Yes	Private
112	179 Saphan Yao road	Pocket park		3		Functional	Yes	Private
113	428 Si Phraya	Pocket park			10	Functional	Yes	Private
114	76 Soi Phuttha Osot	Vacant	1	1		Unfunctional	No	Private
115	275 Soi Saphan Yao	Vacant		1		Functional	Yes	Private
116	202/1 Soi Saha Mit	Vacant			50	Unfunctional	No	Private
117	Piyamitr Building	Pocket park			10	Functional	Yes	Private
118	Assumption College	Pocket park			30	Functional	Yes	Private
119	70 Soi Pramot	Pocket park		2	77	Functional	Yes	Private
120	192 - 194 Surawong road	Vacant		1	5	Unfunctional	No	Private
121	Silom Grand Terrace	Pocket park			80	Functional	Yes	Private
122	Trinity Complex	Streetscape			30	Functional	Yes	Semi-private
123	Holiday Inn Express	Streetscape			60	Functional	Yes	Semi-private
124	Anna & Son	Streetscape			30	Functional	Yes	Semi-private
125	Baby 2 Braces	Streetscape			10	Functional	Yes	Semi-private
126	Ivy Sathorn 10	Pocket park			50	Functional	Yes	Private
127	523/1 Maha Phruettharam road	Streetscape			50	Functional	Yes	Semi-private
128	The Treasure	Pocket park			10	Functional	Yes	Private
129	M Silom	Pocket park			60	Functional	Yes	Private
130	Space next to 22 Phiphat soi 2	Vacant			30	Unfunctional	No	Private
131	41 Soi Phiphat	Pocket park			50	Functional	Yes	Private
132	Bandara Suites Silom	Pocket park			50	Functional	Yes	Private
133	29/1-132 Sala Daeng road	Pocket park			80	Functional	Yes	Private
134	108 Maha Set road	Pocket park		1	50	Functional	Yes	Private
135	38 Narat road	Pocket park	1		50	Functional	Yes	Private
136	183 Soi Saphan Yao	Pocket park		1		Functional	Yes	Private
137	21 Soi Phet Phloi	Pocket park			35	Functional	Yes	Private
138	190 Soi Saphan Yao	Pocket park			70	Functional	Yes	Private
139	83 Sep road	Pocket park		2		Functional	Yes	Private
140	Panburi Building	Pocket park			25	Functional	Yes	Private
141	The Foodie	Pocket park			30	Functional	Yes	Semi-private
142	So Fitel So Bangkok	Vertical garden		1	50	Functional	No	Private
143	Gems Pavilion	Pocket park		1	82.43	Functional	Yes	Private
144	177 Soi Saphan Yao	Vacant		1	5	Unfunctional	No	Private
145	Space next to 214 Soi Pramot	Vacant		1		Unfunctional	No	Private
146	Space next to 374 Silom road	Vacant			20	Unfunctional	No	Semi-private
147	Shell N. Sathorn	Streetscape			6	Functional	Yes	Semi-private
148	The Dipolment	Pocket park		1		Functional	Yes	Semi-private
149	Space next to 311-313 Soi Trok Nakhon Thai	Vacant		1		Unfunctional	No	Private
150	10 Soi Nom Chit	Pocket park			50	Functional	Yes	Private

Table A.2

Private green space in Bang Rak District (Cont.)

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
151	Sajja Pittaya School	Pocket park		1	87	Functional	Yes	Private
152	The Royal Sala Daeng road	Pocket park			20	Functional	Yes	Private
153	Space next to 92/8 Soi Phuttha Osot	Vacant		1		Unfunctional	No	Private
154	Sabai Sathorn Apartment	Pocket park			50	Functional	Yes	Private
155	The Legend Sala Daeng road	Pocket park			7	Functional	Yes	Private
156	M Molde	Pocket park			10	Functional	Yes	Private
157	Vertiq Si Phraya	Pocket park		1		Functional	Yes	Private
158	Wish @ Samyan	Pocket park		1		Functional	Yes	Semi-private
159	115-115/1 Soi Nom Chit	Pocket park		1		Functional	Yes	Private
160	584 Rama IV road	Pocket park		1		Functional	Yes	Private
161	Space next to Silom Suite	Vacant		2		Unfunctional	No	Private
162	116-116/1 Surawong road	Pocket park		2		Functional	Yes	Private
163	Trok Nakhon Thai	Vacant		1		Unfunctional	No	Private
164	Honda Sathorn road	Pocket park			6	Functional	Yes	Private
165	Silom Complex	Streetscape			10	Functional	No	Semi-private
166	Soi Song Phra	Other			56	Unfunctional	No	Private
167	349-349/3 Si Phraya road	Pocket park		3	5	Functional	Yes	Private
168	3/5 Soi Santiphap	Pocket park		1	12	Functional	Yes	Private
169	78,84,88,96 Soi Santiphap 1	Pocket park		3	50	Functional	Yes	Private
170	81 Soi Toem Sap	Pocket park			48	Functional	Yes	Private
171	Space next to Si Phraya Apartment	Other			72	Unfunctional	No	Private
172	Soi Suksan	Other		3	55	Unfunctional	No	Private
173	Pullman	Pocket park		2	10	Functional	Yes	Semi-private
174	Lim Seng Yu	Pocket park			55	Functional	Yes	Private
175	124-130 Soi Saphan Tia	Vertical garden		1		Functional	No	Private
176	Sui Heng Lee	Streetscape			40	Functional	No	Semi-private
177	Soi Fraser and Neave	Other		2	50	Unfunctional	No	Private
178	Space next to 196/7 Si Phraya road	Other			39	Unfunctional	No	Private
179	Wat Hua Lamphong	Pocket park		1	75	Functional	Yes	Semi-private
180	347/4 Si Phraya road	Pocket park			45	Functional	Yes	Private
181	Buddhajak School	Pocket park		1	25	Functional	Yes	Private
182	189 Soi Santiphap 1	Pocket park	1	1		Functional	Yes	Private
183	10/2 Divana Clinic	Pocket park			40	Functional	Yes	Private
184	279/4 Soi Charoen Krung 43	Pocket park			72	Functional	Yes	Private
185	445 Soi Sawang 7	Pocket park			10	Functional	Yes	Private
186	175 Soi Santiphap	Pocket park		3	84	Functional	Yes	Private
187	Sri Wiang road	Other	6			Unfunctional	No	Private
188	Soi Toem Sap	Other		3	25	Unfunctional	No	Private
189	Wat Muang Khae	Pocket park			12.5	Functional	Yes	Semi-private
190	127 Soi Santiphap	Pocket park			25	Functional	Yes	Private
191	Soi Toem Sap Naretroad	Other		2		Unfunctional	No	Private
192	39 Silom soi 9	Pocket park			20	Functional	Yes	Private
193	KCC Building	Pocket park			25	Functional	Yes	Semi-private
194	Life Sathorn	Pocket park		3		Functional	Yes	Private
195	The Ritz Carlton Residences Bangkok	Pocket park		1	10	Functional	Yes	Semi-private
196	The Address Sathorn	Pocket park		3	50	Functional	Yes	Private
197	Sofitel So Bangkok	Pocket park		2	62.5	Functional	Yes	Semi-private
198	60 Sathorn soi 4	Pocket park			67.5	Functional	Yes	Private
199	Naretroad	Other		3	80.25	Unfunctional	No	Private
200	12/8 N. Sathorn road	Pocket park		1	50	Functional	Yes	Private

Ref. code: 25656316123063BUO

Table A.2

Private green space in Bang Rak District (Cont.)

201	2 Soi Santiphap	Pocketpark		1	50	Functional	Yes	Private
202	12/7 Sathorn soi 2	Pocketpark			12	Functional	Yes	Private
203	Kbank N. Sathorn	Pocketpark			52.5	Functional	Yes	Semi-private
204	14/2 Sathorn soi 2	Pocketpark		1	65	Functional	Yes	Private
205	58/1-2 Sathorn soi 4	Pocketpark		1	12.5	Functional	Yes	Private
206	Sathorn Inn	Streetscape			50	Functional	No	Semi-private
207	73,75 Sathorn soi 10	Pocketpark			30	Functional	Yes	Private
208	49/1 Ban Jadtana	Pocketpark		1	20	Functional	Yes	Private
209	Entrance of the expressway at Surawong	Streetscape		1	50	Functional	Yes	Private
210	195/1 Sathorn soi 12	Pocketpark			20	Functional	Yes	Private
211	22 Soi Pramod	Pocketpark			60	Functional	Yes	Private
212	Ban Suriyasai	Pocketpark			60	Functional	Yes	Private
213	Exit of the expressway at Silom	Other		2	50	Unfunctional	No	Private
214	81 Sep road	Pocketpark			10	Functional	Yes	Private
215	Silom City Hotel	Pocketpark			20	Functional	No	Private
216	49/2 Banjitsuk	Pocketpark			60	Functional	Yes	Private
217	80 Soi Pramod 1	Pocketpark			11.25	Functional	Yes	Private
218	Krung Sri Ayutthaya Bank Surawong	Pocketpark			75	Functional	Yes	Semi-private
219	71,71/1-2 Sothorn road	Pocketpark			50	Functional	Yes	Private
220	22 Silom soi 11	Pocketpark			36	Functional	Yes	Private
221	Buntanaphan	Pocketpark			50	Functional	Yes	Private
222	11 Trok Mo Phet Mo Phloi	Pocketpark			50	Functional	Yes	Private
223	33 Trok Mo Phet Mo Phloi	Pocketpark	1			Functional	Yes	Private
224	285 Surawong road	Pocketpark	2	3		Functional	Yes	Private
225	C.H. LAPIDARIES	Pocketpark			50	Functional	Yes	Private
226	Nelson Hays Library	Pocketpark		1	50	Functional	Yes	Private
227	428	Pocketpark		3		Functional	Yes	Private
228	79 Si Phraya road	Pocketpark		1	59	Functional	Yes	Private
229	70 Soi Song Phra	Pocketpark			20	Functional	Yes	Private
230	Surawong road	Other	1	3		Unfunctional	No	Private
231	75/79 Soi Phuttha Osot	Pocketpark			67.5	Functional	Yes	Private
232	35 Maha Set road	Pocketpark			50	Functional	Yes	Private
233	The Bangkok	Pocketpark, Canalscape		3	90	Functional	Yes	Semi-private
234	33/1 Trok Mo phet Mo Phloi	Pocketpark	1	1		Functional	Yes	Private
235	65 Trok Mo Phet Mo Phloi	Pocketpark		1		Functional	Yes	Private
236	511 Maha Set road	Pocketpark			30	Functional	Yes	Private
237	11 Silom soi 11	Pocketpark			59	Functional	Yes	Private
238	Bangkok Bank Headquarter Office	Pocketpark		1	25	Functional	Yes	Semi-private
239	Cathay Lease Plan	Pocketpark			30	Functional	Yes	Private
240	Outdoor sportfield at Trok Ha Nai	Pocketpark	2	1		Functional	Yes	Public
241	6/1-3 Pramuan road	Pocketpark			30	Functional	Yes	Private
242	Sengthong Thani Tower	Pocketpark			50	Functional	Yes	Semi-private
243	Sun Yang Food	Pocketpark			92	Functional	Yes	Private
244	Pan Pacific	Pocketpark		2	20	Functional	Yes	Semi-private
245	Tisco Building	Streetscape			50	Functional	Yes	Semi-private
246	Haroon Mosque	Pocketpark	2		25	Functional	Yes	Private
247	50 N. Sathorn road	Pocketpark			40	Functional	Yes	Private
248	134 Maha Set road	Pocketpark			33	Functional	Yes	Private
249	Tenghai Association of Thailand	Pocketpark			17.5	Functional	Yes	Private
250	88 Soi Anuman Rajdhon	Pocketpark			50	Functional	Yes	Private

Ref. code: 25656316123063BUO

Table A.2

Private green space in Bang Rak District (Cont.)

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
251	Than Ying	Pocket park			37.1	Functional	Yes	Private
252	8/1 Pramuan road	Pocket park			82.5	Functional	Yes	Private
253	Christ Church Bangkok	Pocket park		1	50	Functional	Yes	Private
254	73 Naradhiwas Rajanagarindra road	Pocket park		1	20	Functional	Yes	Private
255	Silom City Resort	Streetscape			30	Functional	Yes	Semi-private
256	116 N. Sathorn road	Pocket park			30	Functional	Yes	Private
257	Q House Convent road	Streetscape			12.5	Functional	Yes	Semi-private
258	33-33/1 Sathorn soi 6	Pocket park			55	Functional	Yes	Private
259	Lerdsin Hospital	Pocket park		3		Functional	Yes	Private
260	Prachachon Company	Pocket park			7.5	Functional	Yes	Private
261	148 N.Sathorn road	Pocket park		1	50	Functional	Yes	Private
262	BNH Hospital	Streetscape			70	Functional	Yes	Semi-private
263	Bubhajit Office	Pocket park			90	Functional	Yes	Semi-private
264	136/1 N. Sathorn road	Pocket park		1	20	Functional	Yes	Private
265	118 N. Sathorn road	Pocket park			55	Functional	Yes	Private
266	Healthland Sathorn soi 12	Pocket park			50	Functional	Yes	Semi-private
267	136 N.Sathorn road	Pocket park		1	12	Functional	Yes	Private
268	Evergreen Laurel Hotel	Pocket park			10	Functional	Yes	Semi-private
269	Abdulrahim Place	Pocket park	1	3		Functional	Yes	Private
270	Joy Kindergarten	Pocket park			97	Functional	Yes	Private
271	Mandarin Oriental	Pocket park			50	Functional	Yes	Private
272	19 Soi Phiphat	Pocket park			50	Functional	Yes	Private
273	Second Church Samyan	Pocket park			90	Functional	Yes	Private
274	Thailand Privilege Card	Pocket park		1		Functional	Yes	Private
275	Bangkok Centre Hotel	Streetscape		1	20	Functional	No	Semi-private
276	Baba Chinese Cemetery	Pocket park		1	75	Functional	Yes	Private
277	Bangkok Christian College	Sport Field	3	3	75	Functional	Yes	Private
278	Kalapapruk Restaurant	Pocket park	1	1	22.1	Functional	Yes	Private
279	75 Naradhiwas Rajanagarin road	Pocket park		1	50	Functional	Yes	Private
280	42/1 Soi Phiphat	Pocket park			30	Functional	Yes	Semi-private
281	Assumption College Spart Field	Sport Field	1		25	Functional	Yes	Private
282	Dusit Thani Hotel Rama IV	Pocket park	1	2	50	Functional	Yes	Semi-private
283	17 Soi Phiphat	Pocket park			25	Functional	Yes	Private
284	Soi Phuttha Osot Naret road	Other	7	1	70	Unfunctional	No	Private
285	Space next to Tongnguan Furniture	Other			49	Unfunctional	No	Private
286	Soi Song Phra Si Phraya road	Other	6	1		Functional	Yes	Semi-private
287	CAT Telecom Tower	Pocket park	1		25	Functional	Yes	Private
288	Bangkok Commercial Asset Management	Pocket park	2			Functional	Yes	Semi-private
289	President House Building	Pocket park			50	Functional	Yes	Private
290	Silpa Thai Electric Import Export	Pocket park			20	Functional	Yes	Private
291	Harindhorn Building	Pocket park			60	Functional	Yes	Semi-private
292	6/4-6 Pramuan road	Pocket park		1	21	Functional	Yes	Private
293	Montien Surawong	Pocket park		2	10	Functional	Yes	Private
294	Bangkok Union Insurance	Pocket park			12.5	Functional	Yes	Semi-private
295	Yip In Tsoi	Pocket park		1	62	Functional	Yes	Private
296	Sorrento Restaurant	Pocket park			25	Functional	Yes	Private
297	Standard Chartered Bank of Thailand	Pocket park		1	25	Functional	Yes	Semi-private
298	U Chu Liang Building	Pocket park		3	60	Functional	Yes	Semi-private
299	Shangrila Hotel	Pocket park		1	20	Functional	Yes	Private
300	AIA Building	Pocket park			10	Functional	Yes	Semi-private
			56	218	8971.26			

Table A.3

Other organization green space in Bang Rak District

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
	Other organization							
1	478/2-71 Si Phraya road	Vacant		1		unfunctional	no	Private
2	Bang Rak Fire Station	Vacant			20	unfunctional	no	Private
3	Vertical garden Lerdsin Hospital	Vertical garden		2		functional	no	Private
4	Surawong Expressway	Other		1	25	unfunctional	no	Public
5	Embassy of Russia	Pocket park	3			functional	yes	Private
6	Embassy of Portugal	Pocket park	1	3	50	functional	yes	Private
7	Under expressways Maha Set Road	Pocket park		3	87.2	functional	yes	Public
8	Embassy of Belgium	Pocket park	2			functional	yes	Private
9	Embassy of Italy	Pocket park			80	functional	yes	Private
10	The Britrist Club	Pocket park	1	3		functional	yes	Private
11	Embassy of France	Pocket park	1	1		functional	yes	Private
12	Mahanakorn Intersection Rama IV Road	Other			40	unfunctional	no	Public
13	Under expressways Sawang soi 6 (Phase 2)	Other	4			unfunctional	no	Public
14	Burma Embassy	Pocket park		1		functional	yes	Private
15	Burma Embassy (Accommodation)	Pocket park	1			functional	yes	Private
16	Under expressways Sawang soi 6	Other	1	2		unfunctional	no	Public
17	Space next to Srirat expressway	Other		1	50	unfunctional	no	Public
18	MRT Rama IV Road Pocket Park	Streetscape		3		functional	yes	Public
19	Space under Mahanakorn expressway	Other	1		25	unfunctional	no	Public
20	Public Health 23 Pocket Park	Pocket park			16.96	functional	no	Public
	Total	33976.64	15	21	394.16			

Ref. code: 25656316123063BUO

APPENDIX B

GREEN SPACES IN SATHORN DISTRICT

Source: Bangkok from Department of Environment and Department of Strategy and Evaluation

Table B.1

Public green space in Sathorn District

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
	Public Sector							
1	Streetscape at the exit of Chan Expressway	Streetscape		2	73	Functional	No	Public
2	Suan Phlu Soi 1	Vacant		2	3	Unfunctional	No	Public
3	Streetscape at Rama IV - S. Sathorn Road	Streetscape			26	Functional	Yes	Public
4	80th Anniversary Celebration Park (Sathorn)	Public Park	17	2	58	Functional	Yes	Public
5	Canalscape at Khlong Kruai	Canalscape		1	94	Functional	Yes	Public
6	Streetscape at Soi Yu Di	Streetscape			93	Functional	Yes	Public
7	Streetscape next to Satri Si Suriyothai School	Streetscape			74	Functional	Yes	Public
8	Canalscape at Khlong Don Ku Sol	Canalscape		1	70	Functional	Yes	Public
9	Streetscape at Soi Yu Di (Charoen Rat Road)	Streetscape		2	86	Functional	Yes	Public
10	Streetscape at the entry of Sathorn Expressway	Streetscape		2	29	Functional	Yes	Public
11	Pocket Park at Ban Nang Sue	Pocket Park			79	Functional	No	Public
12	Canalscape at Khlong Chong Nonsi (Odd Number)	Canalscape	4	3	7	Functional	Yes	Public
13	Canalscape at Khlong Chong Nonsi (Even Number)	Canalscape	5		90	Functional	Yes	Public
14	Streetscape at Naradhiwas Rajanagarindra Road (Odd Number)	Streetscape	5	3	10	Functional	Yes	Public
15	Streetscape at Naradhiwas Rajanagarindra Road (Even Number)	Streetscape	3	2	2	Functional	Yes	Public
16	Streetscape under King taksin the Great Bridge	Streetscape			77	Functional	Yes	Public
17	Streetscape at the intersection between Chan - Naradhiwas Rajanagarindra Road	Streetscape			23	Functional	Yes	Public
18	Pocket Park at Ban Baep Outdoor Sport Field	Pocket Park			100	Functional	Yes	Public
19	Streetscape at the intersection between Chan - Naradhiwas Rajanagarindra Road (	Streetscape			19	Functional	Yes	Public
20	Pocket Park at Don Kuson Phatthana	Pocket Park	1		32	Functional	Yes	Public
21	Pocket Park at Yanawa Police Station	Pocket Park			47	Functional	Yes	Public
22	Pocket Park at Charoen Rat Intersection	Pocket Park		3	17	Functional	Yes	Public
23	Pocket Park at Tungmahamek Football Field	Pocket Park	1		40	Functional	Yes	Public
24	Pocket Park at Worarat Shopping Center	Pocket Park		1	85	Functional	Yes	Public
25	Pocket Park at the exit of S. Sathorn Expressway	Pocket Park			30	Functional	Yes	Public
26	Pocket Park at Don Kuson Ruamjai	Pocket Park			79	Functional	Yes	Public
27	Streetscape at Immigration Bureau	Streetscape			34	Functional	Yes	Public
28	Streetscape at Nang Linchi Road	Streetscape	2		12	Functional	Yes	Public
29	Streetscape at the intersection between Chan - Naradhiwas Rajanagarindra Road (	Streetscape			11	Functional	Yes	Public
30	Streetscape at Suanplu Pattana	Streetscape			83	Functional	Yes	Public
31	Canalscape at Khlong Don Kuson	Canalscape		2	92	Functional	Yes	Public
32	Streetscape at Chan Road	Streetscape		1	35	Functional	Yes	Public
33	Canalscape at Khlong Sathorn	Canalscape	2	1	24	Functional	No	Public
34	Pocket Park at U-turn of Naradhiwas Rajanagarindra Road	Pocket Park			43	Functional	No	Public
35	Pocket Park at Police Booth Charoen Rat Road	Pocket Park			52	Functional	Yes	Public
36	Pocket Park at Mooban Charoensukjai	Pocket Park			73	Functional	Yes	Public
37	Streetscape at TOT (Sector 4)	Streetscape			37	Functional	Yes	Public
38	Streetscape at Apostolic Nunciature Embassy of the Holy See	Streetscape			38	Functional	Yes	Public
39	Streetscape at Charoen Krung (Odd Number)	Streetscape	1		85	Functional	Yes	Public
40	Canalscape at Saphan Khlong Kruai	Canalscape			49	Functional	Yes	Public
41	Streetscape at Bangkok City Power	Streetscape			53	Functional	Yes	Public
42	Streetscape at TOT (Sector 3)	Streetscape			44	Functional	Yes	Public
43	Pocket Park at Sillapawittaya School	Pocket Park			14	Functional	Yes	Public
44	Streetscape TTB Bank	Streetscape			8	Functional	Yes	Public
45	Pocket Park at Teochew Cemetary	Pocket Park		1	26	Functional	Yes	Public
46	Pocket Park at Rama IV Road	Pocket Park			10	Functional	No	Public
47	Streetscape at Intersection between Chan - Sathu Pradit Road	Streetscape			2	Functional	No	Public
48	Pocket Park at Charoen Rat Road	Pocket Park			25	Functional	Yes	Public
49	Streetscape at TOT (Sector 2)	Streetscape			13	Functional	Yes	Public
50	Streetscape at TOT (Sector 5)	Streetscape			8	Functional	Yes	Public
51	Pocket Park at Bangkok South Civil Court	Pocket Park			50	Functional	Yes	Public
52	Streetscape at Thammasat Association	Streetscape			51	Functional	Yes	Public

Ref. code: 25656316123063BUO

Table B.1

Public green space in Sathorn District (Cont.)

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
53	Streetscape at Naradhiwas Rajanagarindra - S. Sathorn Road	Streetscape			24	Functional	No	Public
54	Streetscape At Embassy of Singapore	Streetscape			48	Functional	Yes	Public
55	Pocket Park at Khlong Khwang Soi Yen Arkat	Pocket Park			20	Functional	Yes	Public
56	Streetscape at Yen Arkat Road	Streetscape		2	95	Functional	Yes	Public
57	Streetscape at S. Sathorn Road	Streetscape			14	Functional	Yes	Public
58	Streetscape at Saint Louis Hospital	Streetscape			6	Functional	Yes	Public
59	Traffic Island at Sathorn - Rama III Road	Streetscape	7	1	60	Functional	No	Public
60	Canalscape at Wat Yannawa	Canalscape			50	Functional	Yes	Public
61	Streetscape at Naradhiwas Rajanagarindra - S. Sathorn Road (L)	Streetscape			9	Functional	Yes	Public
62	Pocket Park under Expressway Authority of Thailand	Pocket Park		2	72	Functional	Yes	Public
63	Pocket Park at Tio Chew Association of Thailand	Pocket Park		3	47	Functional	Yes	Public
64	Streetscape at Suanplu Pattana	Streetscape		1	21	Functional	Yes	Public
65	Streetscape at the exit of Chan Expressway	Streetscape		2	88	Functional	No	Public
66	Canalscape at Khlong Don Kuson	Canalscape			58	Functional	No	Public
67	Pocket Park at Sathorn District Administration Office	Pocket Park			73	Functional	Yes	Public
	Total	13.80216441	48	40	3000			
		Sq.m						

Ref. code: 25656316123063BUO

Table B.2

Private green space in Sathorn District

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
	Private Sector							
1	Ascott Sathorn Bangkok	Pocket Park	1		50	Functional	Yes	Semi-private
2	Vacant space at Naradhiwas Rajanagarindra Soi 10	Vacant		1	19	Unfunctional	No	Private
3	Vacant space at Sathorn Soi 11	Vacant		2	61	Unfunctional	No	Private
4	Space at Charoen Rat Soi 1 (6-1)	Vacant	1	1	90	Unfunctional	No	Private
5	Space at Charoen Rat Soi 1 (9)	Vacant		2	27	Unfunctional	No	Private
6	Vacant space at Macro	Vacant	1	1	41	Unfunctional	No	Private
7	Vacant space at Saeng Chan Market	Vacant	1	3	40	Unfunctional	No	Private
8	Vacant space at Naradhiwas Rajanagarindra Soi 11/3	Vacant		2	16	Unfunctional	No	Private
9	Vacant space at Naradhiwas Rajanagarindra Soi 11/3	Vacant		2	16	Unfunctional	No	Private
10	Outdoor Sport Field at Phramae Mary Sathorn 2	Sport Field	2		40	Functional	Yes	Private
11	Outdoor Sport Field at Phramae Mary Sathorn 1	Sport Field	1	2	73	Functional	Yes	Private
12	Vacant space at Suanplu 2	Vacant	6	3	51	Unfunctional	No	Private
13	Vacant space at Sathorn Soi 11 (1/1)	Vacant		3	46	Unfunctional	No	Private
14	Vacant space at Ban Baep Community	Vacant		2	23	Unfunctional	No	Private
15	Vacant space at Soi Phraya Piran	Vacant	3	1	85	Unfunctional	No	Private
16	Vacant space at Sathorn Soi 11	Vacant	1		46	Unfunctional	No	Private
17	Vacant space at Nang Linchi Soi 4/1	Vacant		1	46	Unfunctional	No	Private
18	Vacant space at Soi Si Bamphen	Vacant			42	Unfunctional	No	Private
19	Pocket Park at Thammasat Association	Pocket Park		3	93	Functional	Yes	Public
20	Vacant space at Nang Linchi Soi 4	Vacant		3	60	Unfunctional	No	Private
21	Vacant space at Sathorn Soi 11 (13)	Vacant		1	63	Unfunctional	No	Private
22	Vacant space at Macro (Sector 2)	Vacant		3	66	Unfunctional	No	Private
23	Vacant space at Soi Prongjai	Vacant	2		93	Unfunctional	No	Private
24	Vacant space at Macro (Sector 1)	Vacant		2	16	Unfunctional	No	Private
25	Pocket Park at Saint Louis	Pocket Park	1		92	Functional	Yes	Private
26	Vacant space at Sathorn Soi 15	Vacant	1	2	10	Unfunctional	No	Private
27	Vacant space at Naradhiwas Rajanagarindra Soi 14	Vacant	1	1	60	Unfunctional	No	Private
28	Vacant space at Naradhiwas Rajanagarindra Soi 6	Vacant		2	64	Functional	Yes	Private
29	Vacant space at Naradhiwas Rajanagarindra Soi 15	Vacant		1	23	Unfunctional	No	Private
30	Vacant space at Naradhiwas Rajanagarindra Soi 7	Vacant	1		75	Unfunctional	No	Private
31	Vacant space at Soi Chan	Vacant	2		49	Unfunctional	No	Private
32	Vacant space at Nang Linchi Soi 2/1	Vacant		2	62	Unfunctional	No	Private
33	Vacant space at Soi Kraisi	Vacant	4	2	33	Unfunctional	No	Private
34	Vacant space at Naradhiwas Rajanagarindra Soi 11/2	Vacant	1		39	Unfunctional	No	Private
35	Vacant space at Naradhiwas Rajanagarindra Soi 11/1	Vacant		2	89	Unfunctional	No	Private
36	Vacant space at Soi Yen Arkat	Vacant	4	3	2	Unfunctional	No	Private
37	Vacant space at Suanplu Soi 1/2	Vacant		1	62	Unfunctional	No	Private
38	Vacant space at Soi Phi Chai 2	Vacant		3	2	Unfunctional	No	Private
39	Vacant space next to Soi Phi Chai 2	Vacant	3	2	82	Unfunctional	No	Private
40	Vacant space at Nang Linchi Soi 6	Vacant	2		40	Unfunctional	No	Private
41	Vacant space at Talad Khun Ying Boon Mee	Vacant	3	1	84	Functional	Yes	Semi-private
42	Vacant space at Forum Park Hotel	Vacant	2	2	88	Unfunctional	No	Private
43	Vacant space at Soi Chan 14	Vacant	1	1	26	Unfunctional	No	Private
44	Vacant space at Naradhiwas Rajanagarindra Soi 11/1	Vacant	1	1	24	Unfunctional	No	Private
45	Vacant space at Sathorn Soi 11 (5)	Vacant		2	2	Unfunctional	No	Private
46	Vacant space at Phramae Mary Sathorn School	Vacant	1	3	78	Unfunctional	No	Private
47	Vacant space at Kuson Thong Community	Vacant	1	2	17	Functional	Yes	Semi-private
48	Pocket Park at Parco Condominium	Pocket Park	1			Functional	Yes	Private
49	Private Park at MR Kukrit Pramoj House	Private Park	6		46	Functional	Yes	Semi-private
50	Vacant space at Nang Linchi Soi 2	Vacant	2		99	Unfunctional	No	Private
51	Vacant space behind Satri Si Suriyothai School	Vacant		2	24	Unfunctional	No	Private
52	Private Park at The Sukhothai Bangkok	Private Park	2	3	41	Functional	Yes	Private

Ref. code: 25656316123063BUO

Table B.2

Private green space in Sathorn District (Cont.)

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
53	Pocket Park at Supalai Elite Sathorn	Pocket Park		1	55	Functional	Yes	Private
54	Vacant space behind Supalai Elite Sathorn	Vacant	1	2	94	Unfunctional	No	Private
55	Pocket Park at Somerset Park Suanplu Bangkok	Pocket Park	1		15	Functional	Yes	Private
56	Vacant space next to outdoor sport filed of Ban Baep Community	Vacant		3	62	Unfunctional	No	Private
57	Vacant space at Soi Suanplu 1	Vacant	5	2	6	Unfunctional	No	Private
58	Vacant space at Soi Suwan Sawat	Vacant		2	23	Unfunctional	No	Private
59	Space at Susan Chin Khae	Other	4	2	61	Functional	No	Private
60	Vacant space at Naradhiwas Rajanagarindra Soi 11/2	Vacant	1	2	1	Unfunctional	No	Private
61	Vacant space at Soi Chan 28	Vacant	2		88	Unfunctional	No	Private
62	Vacant space next to Astera Sathorn Hotel	Vacant	1		43	Unfunctional	No	Private
63	Vacant space at Sathorn Soi 11 (4)	Vacant		1	45	Unfunctional	No	Private
64	Vacant space at Naradhiwas Rajanagarindra Soi 11	Vacant		2	12	Unfunctional	No	Private
65	Vacant space at Soi Chan 42	Vacant		2	11	Unfunctional	No	Private
66	Vacant space next to Naradhiwas Rajanagarindra Soi 11	Vacant		2	66	Unfunctional	No	Private
67	Vacant space next to Baan Sang Chan Chai	Vacant		2	20.66	Unfunctional	No	Private
68	Vacant space at Naradhiwas Rajanagarindra Soi 13	Vacant		1	24	Unfunctional	No	Private
69	Vacant space at Soi Phraya Piran	Vacant	1		72	Unfunctional	No	Private
70	Pocket Park at Blossom Condo	Pocket Park	1	3	35	Functional	Yes	Private
71	Pocket Park at Rhythm Sathorn-Narathiwas	Pocket Park		2	90	Functional	Yes	Private
72	Vacant space at Nang Linchi Soi 2	Vacant	4		10	Unfunctional	No	Private
73	Vacant space at Soi Chan 2	Vacant	1	3	16	Unfunctional	No	Private
74	Vacant space at Soi Saphan Khu	Vacant	2		15	Unfunctional	No	Private
75	Pocket space at the exit of Chan Expressway	Vacant	1		5	Unfunctional	No	Private
76	Pocket Park at The Room	Pocket Park		1	41	Functional	Yes	Private
77	Vacant space at Soi Sukhumvit 71 (Soi Pridi)	Vacant	1	1	18	Unfunctional	No	Private
78	Pocket Park at Rhythm Sathorn Condominium	Pocket Park		1	35	Functional	Yes	Private
79	Vacant space at Suanplu Soi 1	Vacant	1	3	59	Unfunctional	No	Private
80	Vacant space at Soi Yen Chit 4	Vacant	1		58	Unfunctional	No	Private
81	Vacant space next to Saeng Chan Frash Market	Vacant	1	2	34	Unfunctional	No	Private
82	Pocket Park at Landmark Waterfront	Pocket Park	3	1	79	Functional	Yes	Private
83	Vacant space at Rama IV Road	Vacant	2	1	91	Unfunctional	No	Private
84	Vacant space at Soi Suwan Sawat	Vacant	1	1	78	Unfunctional	No	Private
85	Vacant space next to Khlong Kruai (Warapot Community)	Vacant	1	1	97	Unfunctional	No	Private
86	Vacant space at Charoen Rat Soi 1 (1)	Vacant		3	64	Unfunctional	No	Private
87	Pocket Park under the exit of Sathorn Expressway	Pocket Park	1		50	Functional	Yes	Public
88	Vertical Garden at The Met Sathorn	Vertical Garden		1	84	Functional	No	Private
89	Vacant space at Ban Baep Community	Vacant	1	1	83	Unfunctional	No	Private
90	Pocket Park at The Met Sathorn	Pocket Park	3	2	87	Functional	Yes	Private
91	Vacant space at Sathorn Soi 11 (9)	Vacant	2	1	19	Unfunctional	No	Private
92	Space at Muslim Cemetry	Other	3	3	66	Functional	No	Private
93	Vacant space at Soi Chan 34/1	Vacant	2		54	Unfunctional	No	Private
94	Vacant space at Sathorn Soi 11 (1)	Vacant	1	3	18	Unfunctional	No	Private
95	Vacant space next to Warapot Community	Vacant	2	2		Unfunctional	No	Private
96	Pocket Park at Fuse Chan-Sathorn	Pocket Park		2	30	Functional	Yes	Private
97	Vacant space next to Charoen Rat 8	Vacant		3	42	Functional	Yes	Private
98	Vacant space at Soi Sathu Pradit 6	Vacant	2		50	Unfunctional	No	Private
99	Vacant space at Soi Chan 18/7 (20)	Vacant	5	1	87	Unfunctional	No	Private
100	Vacant space next to Charoen Rat 8	Vacant		2	9	Unfunctional	No	Private
101	Vacant space at Wat Prok	Vacant	2	2	98	Unfunctional	No	Private
102	Vacant space at Nang Linchi Soi 6	Vacant	1	1	48	Unfunctional	No	Private
103	Vacant space at Nang Linchi Soi 2	Vacant	1		99	Unfunctional	No	Private
104	Pocket Park under Expressway Soi Yu Dee	Pocket Park	1	3	6	Functional	Yes	Public

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Table B.2

Private green space in Sathorn District (Cont.)

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
105	Vacant space at Chan Kao Road	Vacant	3		86	Unfunctional	No	Private
106	Outdoor Sport Field at Kosolphattharawit School	Sport Field	3	3	17	Functional	Yes	Private
107	Vacant space at Poh Teck Tung 2	Vacant	3	3	54	Unfunctional	No	Private
108	Vacant space at Poh Teck Tung	Vacant	2		63.25	Unfunctional	No	Private
109	Outdoor Sport Field at Assumption College Primary Section	Sport Field	3	2	56	Functional	Yes	Private
110	Vacant space at Naradhiwas Rajanagarindra Soi 6	Vacant	4	1	77	Unfunctional	No	Private
111	Vacant space at Susan Wat Don 2	Vacant	2	2	1	Unfunctional	No	Private
112	Vacant space next to Duean Phen Restaurant	Vacant	1		60	Unfunctional	No	Private
113	Vacant space at Susan Wat Don	Vacant	1	2	51	Unfunctional	No	Private
114	Vacant space at Aeronautical Radio of Thailand	Vacant	1	2	10	Unfunctional	No	Private
115	Vacant space at Naradhiwas Rajanagarindra Soi 12	Vacant	4	2	67	Unfunctional	No	Private
116	Pocket Park at Saint Louis Hospital 3	Pocket Park		2	88	Functional	Yes	Semi-private
117	Pocket Park next to Ban Baep Outdoor Sport Field	Pocket Park	1	3	78	Functional	Yes	Public
118	Vacant space next to Embassy of Denmark	Vacant	4	2	28	Unfunctional	No	Private
119	Private Park in Austrian Embassy	Private Park	1	1	46	Functional	Yes	Private
120	Outdoor Sport Field at Aeronautical Radio of Thailand	Sport Field	6	1	18	Functional	Yes	Private
121	Outdoor Sport Field at Sot Suksa School	Sport Field	1	3	94	Functional	Yes	Private
122	Private Park at Muslim Cemetry	Private Park	4	3	73	Functional	Yes	Private
123	Streetscape at intersection between Naradhiwas Rajanagarindra - S. Sathorn Roac	Streetscape			44	Functional	Yes	Public
124	Commemoration 80th Anniversary park (Poh Tech Tung Foundation)	Public Park	8	1	55	Functional	Yes	Public
125	Pocket park at Rong Nam Keng Community	Pocket Park		1	79	Functional	Yes	Public
126	Pocket Park under Expressway Authority of Thailand	Pocket Park		1	57	Functional	Yes	Public
127	Teachew Cemetry Park	Public Park	86	2	38	Functional	Yes	Public
128	Pocket Park at Wat Yannawa	Pocket Park		1	99	Functional	Yes	Public
129	Pocket Park in front of Wat Yannawa	Pocket Park			38	Functional	Yes	Public
130	Pocket Park at Wat Yannawa (Riverside)	Pocket Park			94	Functional	Yes	Public
131	Pocket Park next to Ban Nang Sue	Pocket Park			96	Functional	Yes	Private
132	Streetscape at the entry of Chan Expressway	Streetscape		1	11	Functional	Yes	Public
	Total	517791.64	260	189	6547.91			
		sq.m						

Table B.3

Other organization green space in Sathorn District

No.	Location	Type of Green	Rai	Ngang	Wa	Condition	Activity	Private/Public
	Other Organization							
1	Tennis Court (1st Signal Battalion)	Sport Field	1	1	42	Functional	Yes	Semi-private
2	Swimming Pool (1st Signal Battalion)	Sport Field	1	1	14	Functional	Yes	Semi-private
3	Outdoor Sport Field (1st Signal Battalion)	Sport Field	2	1	82	Functional	Yes	Semi-private
4	Pocket Park at Royal Thai Navy Thung Maha Mek	Pocket Park	1		4	Functional	Yes	Public
5	Pocket Park (1st Signal Battalion)	Pocket Park	1		33	Functional	Yes	Private
6	Park at Department of Airport	Private Park	6	3	62	Functional	Yes	Private
7	Pocket Park at BTS Taksin Station	Pocket Park	6	2	3	Functional	Yes	Public
8	Vacant space at Tobacco Monopoly Hospital	Vacant	5	2	27	Unfunctional	No	Private
9	Vacant space at Thai Red Cross Society	Vacant	1		34	Unfunctional	No	Private
10	Sport Field at Borpitpimuk Mahamek Campus	Sport Field	2	1	39	Functional	Yes	Private
11	Sport Field at Nipat Wittaya School	Sport Field	1	3	34	Functional	Yes	Private
12	Private Park at Rajamangala University of Technology Krungthep (Accommodation)	Private Park	7		88	Functional	Yes	Private
13	Pocket Park at Borpitpimuk Mahamek Campus	Pocket Park		3	18	Functional	Yes	Private
14	Outdoor Sport Field (1st Signal Battalion)	Sport Field	11		12	Functional	Yes	Private
15	Pocket Park at Bangkok South Civil Court	Pocket Park		2	20	Functional	Yes	Semi-private
16	Public Park at Soi Yu Di	Public Park	5		21	Functional	Yes	Public
17	Sport Field at Rajamangala University of Technology Krungthep	Sport Field	12	3	79	Functional	Yes	Private
18	Detention Pond at 1st Signal Battalion	Pond	2		6	Functional	Yes	Private
19	Sport Field at Royal Thai Navy Nang Linchi Road	Sport Field	5		60	Functional	Yes	Private
20	Private Park at 1st Signal Battalion	Private Park	3	3	47	Functional	Yes	Private
21	Private Park at Poh Teck Tung Foundation	Private Park	2	3	66	Functional	Yes	Private
22	Streetscape under Expressway Authority of Thailand	Streetscape			75.39	Functional	Yes	Public
23	Pocket park at Saeng Chan Community	Pocket Park			59	Functional	Yes	Public
24	Pocket Park at Mooban Charoensukjai (Ban Nang Sue)	Pocket Park			75	Functional	Yes	Public
25	Pocket Park at Khlong Wat Yanawa	Pocket Park			42	Functional	Yes	Public
26	Public Park under Expressway	Public Park	1	2	46	Functional	Yes	Public
27	Pocket Park at the exit of S. Sathorn Expressway	Pocket Park			89	Functional	Yes	Public
	Total	18.00465481	75	30	1177.39			

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BIOGRAPHY

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Educational Attainment	Academic Year 2020: Bachelor of Urban Design, Thammasat University, Thailand Academic Year 2022: Master of Urban Design, Thammasat University, Thailand

Supisara Khumruangrit. (2022). *Environmental Design for Mental Health: A Case Study of Silom-Sathorn Neighborhood*. Paper presented at the 8th International Young Researchers' Round Table, Fusio, Switzerland.

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