

Research Article

Redesign of Taman Lansia Bandung as a Therapeutic Garden

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Abstract.

Elderly group needs to be paid attention to while redesigning an inclusive city by improving their quality of life to achieve successful aging. The existence of elderly-friendly urban spaces is imperative in promoting mental health and well-being in the scarcity of open spaces in dense urban environments. These spaces can help them to actively maintain health, physical and cognitive functions, and involve with the social environment. Taman Lansia Bandung is one of the thematic parks whose initial purpose was to become an elderly-oriented open space. However, Taman Lansia Bandung felt to be less and less accommodating to the elderly's comfort and ironically provides more attractions for younger visitors to the park. This paper attempts to propose a new design for Taman Lansia with a systematic design approach. A site analysis was conducted to examine the spatial issues such as natural, man-made, physical, and perceptual attributes to develop the contextual design idea. A set of design principles and criteria are generated from a systematic literature review of case studies, related research, and technical standards on accessible design for the elderly and disabled. The result of site analysis and design principles are then formulated into a design vision of the park. A 3D-model was created to simulate the design idea and then compare it with the existing conditions with the photo-match technique. The result is a therapeutic garden that improves the elderly's psychological comfort with a more ergonomic design, closeness to nature, and a multisensory impulse experience.

Keywords: elderly park, therapeutic garden, green open space design, urban landscape, urban spaces

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1. Introduction

1.1. Elderly in Inclusive City

In 2045, it is estimated about one-fifth of the Indonesian population are considered elderly (over 60 years old) [1]. The majority of them (53,75%) reside in an urban area with 43,22% having health complaints, 22,48% experiencing illness in the last month, and 46,8% of COVID-19 deaths in Indonesia are from the elderly [1]. The vulnerability of the elderly in Indonesia is reflected in the 16,76 % ratio of dependency to productive age which means for every 100 productive ages people must cater to almost 17 persons elderly [1]. With the increase in the life expectancy of the population which is estimated to reach 72.2 years in 2030-2035 [2], efforts are needed to improve the quality of life of the elderly to achieve successful aging [3]. Successful aging in the elderly can be seen from the satisfaction with external conditions [4] such as urban environment.

The paramount principle in realizing an inclusive city is the integration of disadvantaged groups including the disabled and elderly [5]. Older and disabled people surely benefited from living in accommodative urban environments, and cities themselves will be benefitted from diverse and socially inclusive communities [6]. There is a growing awareness from the government that all building users should be able to carry out their work and leisure activities efficiently, safely, and pleasurably according to their abilities [6]. In Indonesia, this comes in many regulations and directives such as mentioned in standard guidelines of accessibility which emphasize safety and security, convenience, practicality, and independency in using the public facility for the disabled and elderly [7]. Despite raising awareness and many directives, there seems to be a lag in the design of the built environment to take into account the needs of the elderly and disabled [6] including in the provision of public open space.

1.2. Elderly-friendly Public Open Space

The existence of green open spaces in urban environments indicates the municipal government's performance in improving the ecological balance and citizens' quality of life, including physical and mental health [8][9]. Green open public space has myriad functions in every stage of human life such as environment, recreation, meditation, and social place, starting from childhood, adolescence, and adulthood, to the end of life [10][11]. As a manifestation of the inclusive city paradigm in providing public open space, the existence of thematic parks focuses on the use of public open spaces in a community (based on age group, culture, activities/hobbies, etc.) [12]. One of the community groups

that are accommodated in the thematic park is the elderly. Several studies have shown that the physical-social environment [13] and the natural environment (landscape natural therapy) are associated with longevity and quality of life in old age. The elderly with their physical limitations, such as decreased vision, hearing, kinesthetic, and slow response times [14], have a narrower preference so that they feel more comfortable when they are in a community with relatively the same culture and conditions so that they can psychologically feel more comfortable and safe [15].

There is growing interest in architects and landscape architects of how good design, as well as bad design, may influence people's well-being manifested in the expression of a *healing garden* [16]. This theory has three schools of thought; (1) The Healing Garden School, where the health effects are derived from the experiences of the garden room (design and contents); (2) The Horticultural Therapy School, where the health effects are derived from the activities in the garden room; and (3) The Cognitive School, where the health effects are derived from the experiences and the activities in the garden room [16]. Some examples of the *healing garden* application in an elderly-friendly public open space are *therapeutic gardens* in Singapore [17]. The definition of a *therapeutic garden* is:

„Therapeutic gardens are outdoor gardens designed to meet the physical, psychological and social needs of park users, incorporating design principles derived from scientific evidence [17].“

The first *therapeutic garden* Singapore built was HortPark. This park provides amenities that help restorative activities for the elderly physical and psychological well-being [17].

Decreased cognitive capacity, physical aspects, reduced vision, mobility, and other capacity functions in the elderly can cause anxiety about personal safety and the ability to protect themselves from the feeling of threat. An environment that is easily recognizable will make the elderly feel more comfortable. On the other hand, ease of access to the environment can increase positive perceptions so as to increase the confidence of the elderly to continue to be able to move in their environment, regulate themselves, and show performance to live independently.

1.3. Taman Lansia Bandung

Taman Lansia is a thematic park for the elderly and disabled, which is located on Jl. Cisangkuy, Bandung City covering an area of 1,25 Ha. This park is located in a prominent tourism area with a proximity to Bandung city's landmark of Gedung Sate and the popular

culinary area of Jl. Cisangkuy. This park benefitted from well-maintained lush greenery and the shade of trees' canopy. Although a considerable amount of elderly regularly uses this park, the majority of visitors are teenagers (15-25 years) and young adults (26-35 years). The severe condition of Taman Lansia's facilities contributes to the lack of comfort and security for the physical condition of the elderly and is suggested to be one of the causes of the fewer elderly visiting this park. The elderly visitor hardly accesses the park by public transport with notable barriers and obstacles on the sidewalk and road-crossing.

This study aims to propose a redesign of the Taman Lansia Bandung that can be more accommodating to the physical and psychological needs of the elderly through a systematic design approach. In the development process of the design, the study formulates a vision statement and design principles for a therapeutic garden of Taman Lansia Bandung. It is hoped that the design proposed could help produce an active public open space for the elderly in Bandung.

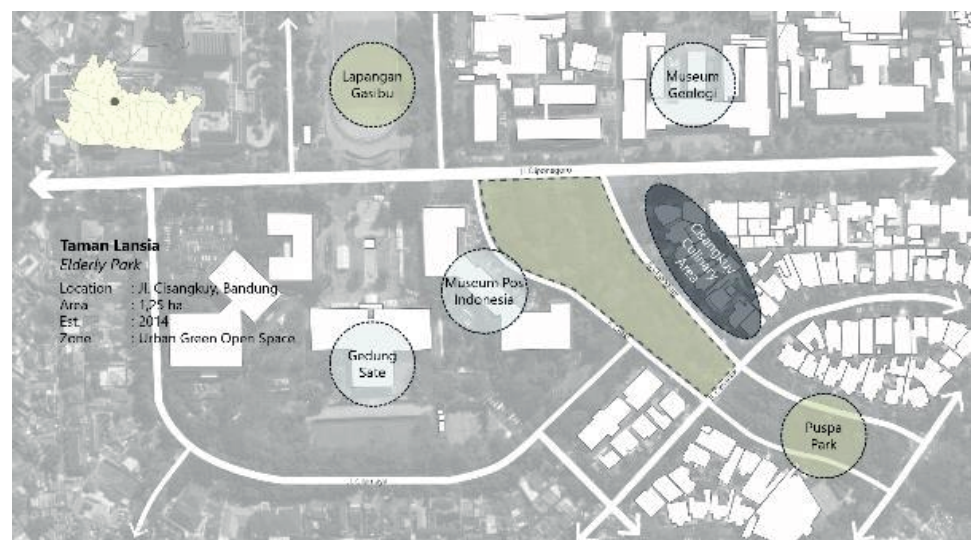


Figure 1: The location context of the study.

2. Methodology

The approach of this study is using a scientific design process [18]. In the scientific design process, design is formulated from theories that generate ideas in the form of a hypothesis, then investigations and observations are conducted to test the idea. The final phase is the development of ideas to confirm the theory inducted. The design

process starting from the stage of investigations to the final result is broadly divided into three stages.

2.1. Data Gathering

This stage aims to collect primary and secondary data. The primary data sought is related to the physical and psychological response of the elderly to visual stimulation that describes an open space design. Other primary data needed are field data related to the context of the research location for conducting site analysis. While the secondary data sought are regulations and standards related to accessibility (universal design), previous studies, and best practices in the design of open spaces for the elderly. The technical standards of accessible open space are gathered from technical guidelines for green open space [19] and technical guidelines for accessibility [7]. These technical standards are used to evaluate the condition of existing facilities. The inventory of existing facilities is conducted from the observation. The result of the inventory is seen in the table below.

TABLE 1: Inventory of Taman Lansia facilities.

No.	Components	Facilities	Amounts (unit)
1	Natural features	River	1
2	Man-made features	Retention pod	1
		Bridge	2
		Fences	
		Deck	2
		Waste bin	
		Benches	
		Signage	
		Charging station	3
		WiFi	
		Gate	5
		Plaza	
3	Buildings	Elderly post	1
		Toilet	2
		Praying room	1
4	Public art	T-Rex statue	1
		Amphiteater	1
5	Pathway	Footpath	1



Figure 2: The existing condition of Taman Lansia.

2.2. Analysis

At this stage, site analysis is carried out based on field data and secondary data to produce design principles. Site analysis [20] is a contextual analysis method used in architectural, landscape, and urban design. This analysis technique is done by diagramming the information, the criteria required, and the initial idea of a design location by the designer as an observer. Site analysis is carried out to produce design inputs that are contextual and responsive to the physical, natural, and socio-cultural conditions of a location.

The factors analyzed in site analysis include natural and man-made features, vegetation, climate, neighborhood, sensory perceptions, circulations, drainage, views, etc. One of the key issues addressed is the disconnected access between transport modes. Despite the multiple modes available in the Taman Lansia area, the sidewalk is not designed well for the ease of pedestrian movement from-and-to the park. The improvement of the sidewalk and public transport facilities must be carried out according to the related standards and guidelines.

2.3. Simulation

At this stage, the design principles are simulated using two-dimensional (2D) and three-dimensional (3D) software to produce design proposals. 3D simulations are carried out to provide a spatial description of the design proposals to respondents using

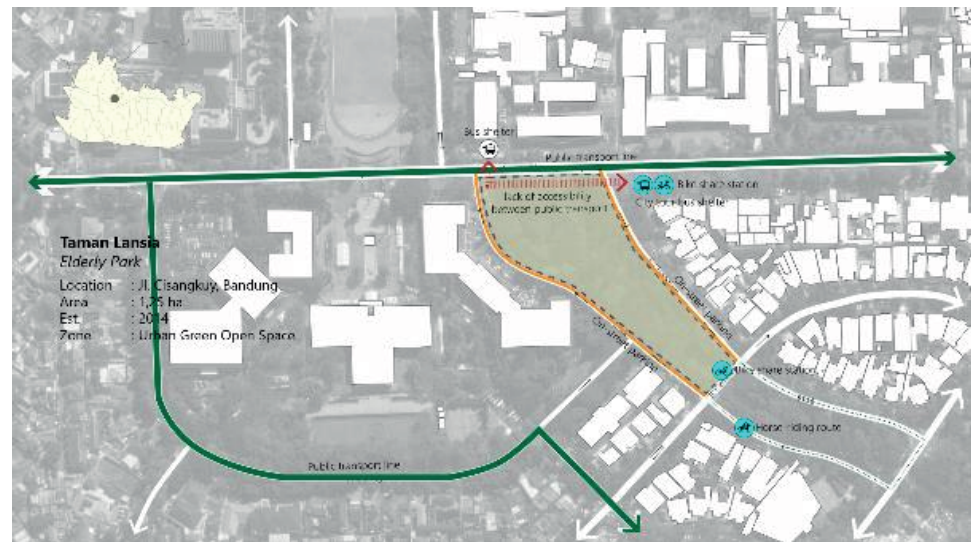


Figure 3: The accessibility issues of the site.

match photo techniques and to simulate the final design results compared to existing conditions.

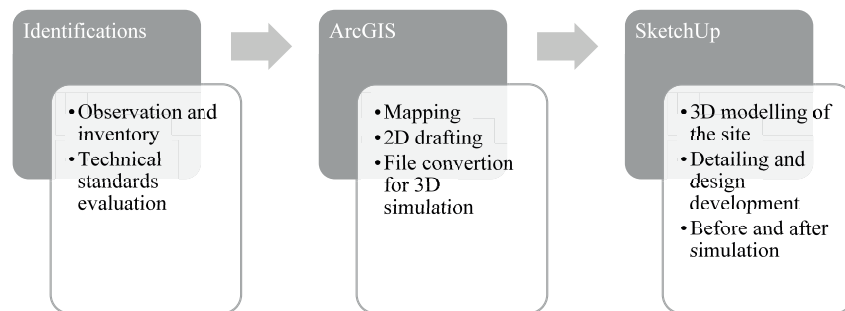


Figure 4: The 3D simulation process of the study.

3. Results

3.1. Design Principles

The literature review was conducted by examining normative criteria, while content analysis was carried out from scientific journal articles and other sources discussing design for the elderly and the design of open spaces in general. Several normative criteria are also contained in the standards and regulations that contain technical provisions for accessibility facilities for the elderly. The results of the literature review in the form of design criteria are classified according to the similarity of aspects of the discussion that are used as design principles.

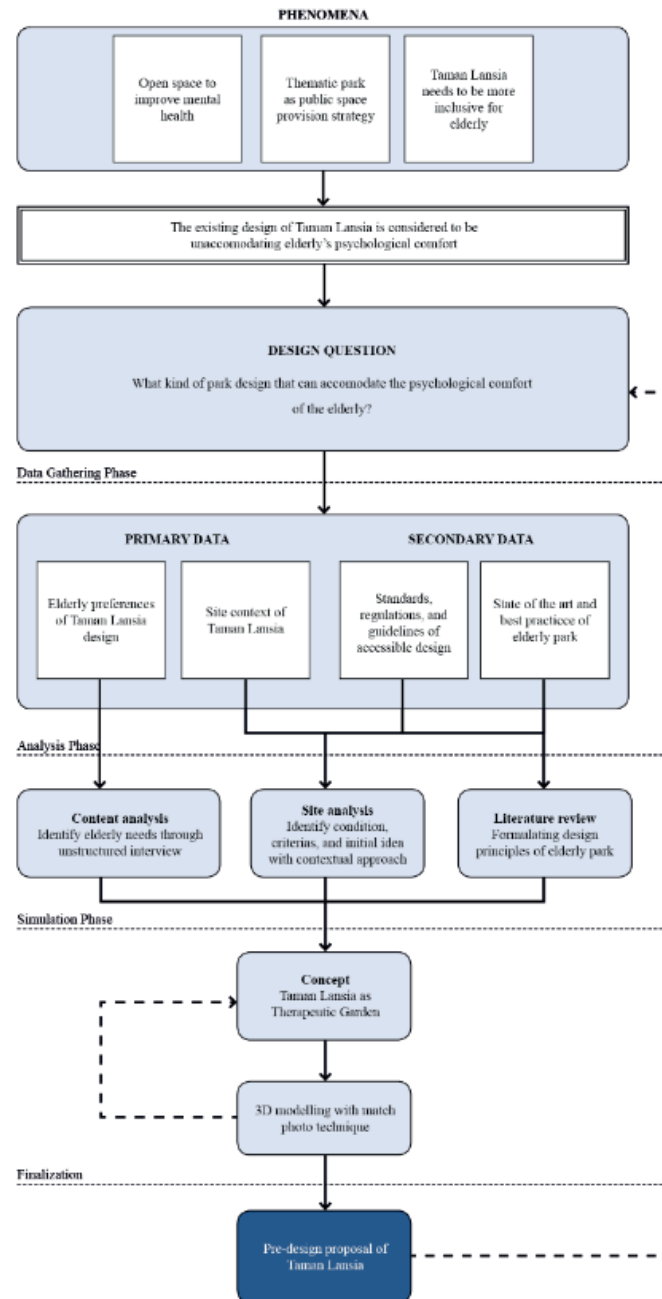


Figure 5: Design method of Taman Lansia as Therapeutic Garden.

3.2. Visioning

The vision proposed for Taman Lansia Bandung is „Taman Lansia as Therapeutic Garden“. A therapeutic garden in this vision means a green open space that catering the psychological and physical needs of the elderly to achieve healthy aging. Taman Lansia is designed to have multiple roles, as an active social space for the elderly and

TABLE 2: Design principles of Taman Lansia.

Criteria	Paula (2022)	Zhai et al. (2020)	Ranperda Kota Bandung (2020)	Design Principles
Security	Adequate lighting for morning and evening		A safe and comfortable building for seniors	Provide lighting in areas where it is possible to exercise in the morning and evening Set a viewing angle that makes it easy to see from outside into the park
Safety	Adequate lighting for morning and evening Consider using a wheelchair and other mobility aids (eg. rollator or walker) Sports equipment must be safe to use with clear instructions		Safe and comfortable streets and sidewalks for the elderly Adequate pedestrian crossings, safe for Seniors, and have non-slip/non-slip markings	Provides smooth pavement of adequate width Avoid as much as possible the presence of steps/stairs, preferably using a ramp with an adequate slope Provide exercise equipment that ergonomically suitable
Health	Stimulate sensory Provides a memory-strengthening experience Promotes physical fitness	Stimulates to walk more Provides features that encourage physical activity Provide a natural environment (vegetation and water bodies) that improves Health	There is a clean environment and free of air, water, and noise pollution	Use a variety of colors as location markers and help with orientation Designing natural landscapes that provide a sensory experience of shape, texture, color, and aroma Provide a walking path with adequate area Provide exercise equipment that ergonomically suitable
Comfort	Taking into account the limitations of mobility caused by old age Provide benches that suit the ergonomics of the Elderly along the walking path Protection from the hot sun and strong wind		A safe and comfortable building for elderly	Provide mobility aids in places where it is needed (eg. handrails, etc.) The bench must have a seat height that is slightly higher than the general bench with a backrest and handrails made of sturdy material Utilize vegetation as heat and wind protection

help to improve physical and mental health with the design features, activities, and the space experience of the garden.

The core programs of therapeutic are divided into two treatments, the passive and active treatments. The passive treatment objectives are: (1) to give therapy in the form

TABLE 2: (Continued).

Criteria	Paula (2022)	Zhai et al. (2020)	Ranperda Kota Bandung (2020)	Design Principles
Access	Strengthen sense of community and social interaction		Adequate pedestrian crossings, safe for elderly, and have non-slip/non-slip markings	Provide easy-to-read and understandable signage along access points to and from the park Designing sidewalks and pedestrian paths according to accessibility standards
Amenities	Diversity of functions and uses Provide space for placing the wheelchair next to the bench	Provides a large active recreation area Provide an open field for physical activity	Availability of outdoor seating Clean and safe public toilets for seniors	Provide park facilities and infrastructure that are in accordance with standards and are easily accessible
Attractiveness	Provide park support facilities and infrastructure that are in accordance with standards and are easily accessible		Provision of green open space	Designing the Elderly Park as an inclusive public space Designing natural landscapes that allow active recreation

of the design experience such as multiple-sensory stimuli by different colors, textures, sound, smells, and micro-climate comfort; (2) to create a cognitively-recognizable space with increased legibility and clarity of signage; and (3) to create tranquil and comfortable space with closeness to nature by providing substantial vegetation and water features. These objectives aim to maintain the health level of cognitive ability of the elderly by exposing them to as enough stimuli as possible.

Meanwhile, the active treatment aims to maintain the physical fitness of the elderly with the provision of interactive space. The objectives of active treatment are: (1) to provide physical exercise facilities which are suitable for the ergonomics of the elderly; and (2) to provide space for social activities to accommodate social comfort in the form of seating and gardening area. The programs are provided with accessibility standards to strengthen the sense of independency when accessing the facilities without help.

3.3. Design Principles

4. Improve Accessibility

To improve the accessibility to Taman Lansia, all public transport stops must be conveniently located as close as possible to Taman Lansia as a destination. The bus shelter is relocated to the North side of Taman Lansia along with the bike-share rack. This way,



Figure 6: Design visioning of Taman Lansia as Therapeutic Garden.

the visitors who use public transport can alighted directly in front of the entrance of the park. Access to the bus shelter across the street is also made easy with at-grade crossing and traffic calming so the pedestrian can cross safely. Another consideration for visitor access is for people who use a wheelchair. To make alighting the vehicle more effortlessly, the traffic current is changing in the opposite direction from the existing and the configuration of on-street parking is changed into parallel parking. That way, the passengers with wheelchair can alight easily from their car into the sidewalk and the entrance of the park.

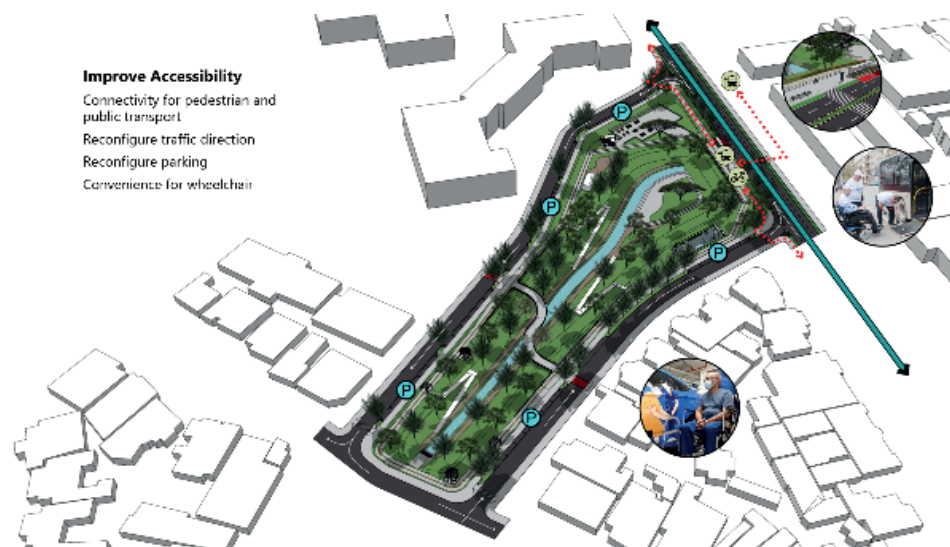


Figure 7: Accessibility principle of Taman Lansia redesign.

4.1. Restorative Zone

The design development of restorative zone focused on optimizing the present of the river along the park. The river should act as the main feature on emphasizing the sense of closeness to nature in the park. The slow current of the river give the opportunity to utilize the river as an active space. A promenade is provided with the steps in the side of the river so the visitor can dipping their feet. This also can act as water therapy. The landscaping of the park utilized to give sensory stimuli such as bright colors in form of various flowers, textures from various shapes of leaf, and aromatic plants such as rosemary, lavender, etc.

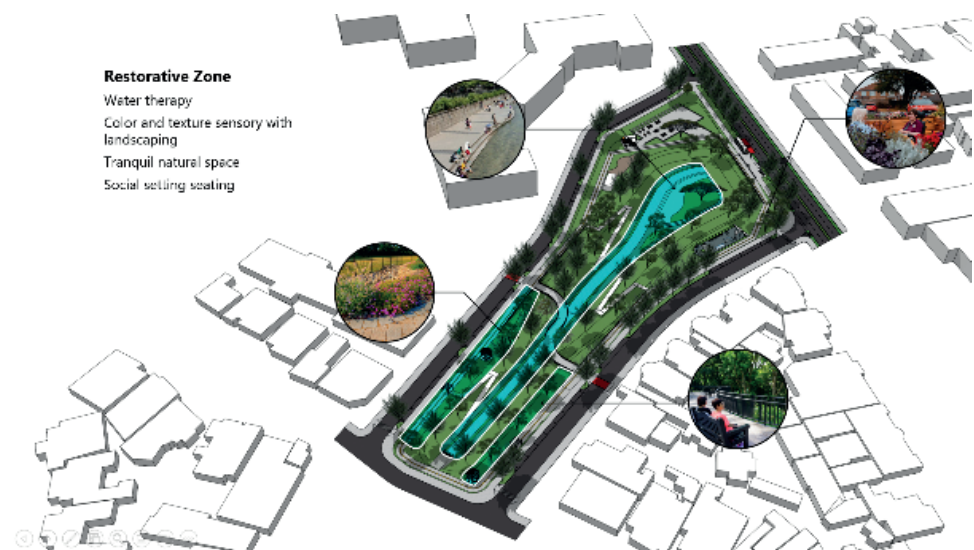


Figure 8: Restorative zone of Taman Lansia redesign.

4.2. Activities Zone

The activities zone objectives are accomplished with the provision of soft exercise facilities for the elderly. The activities in this zone could be carried out individually or with a group. The individual activity such as exercise equipment that specially designs for the physical movement of the elderly. The group activities can be carried out in multi-use spaces for group exercise and gardening areas. The gardening area is equipped with raised and movable planting bed. The height of the planting bed is designed to fit people in wheelchairs and relieve the need to bend over when planting which often hurts the back and spine. The gardening area is also planted with various herbs that can be consumed as herbal medicines.

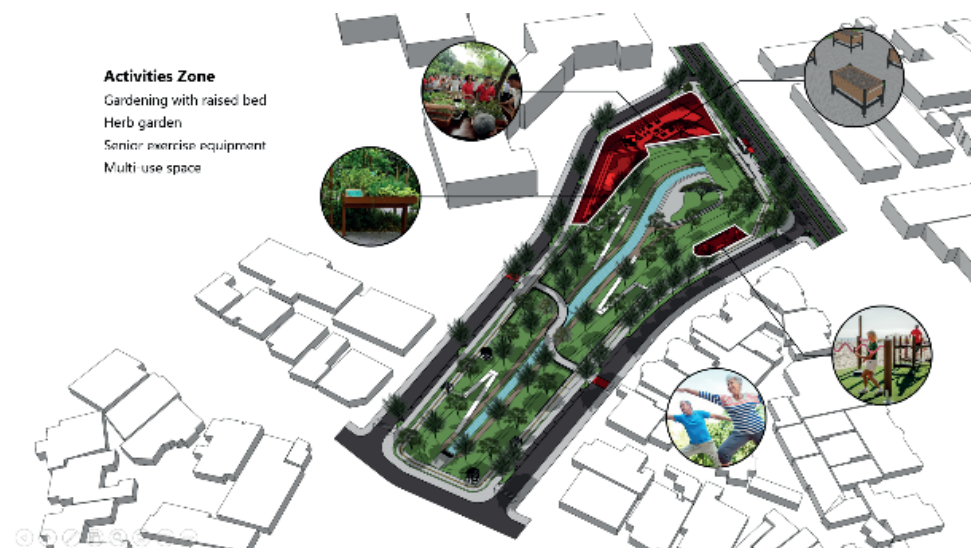


Figure 9: Activities zone of Taman Lansia redesign.

4.3. Photo Match Simulation

Photo match simulations aim to give an overview of what the transformation could look like in a specific area of the designed site. Photo match simulations can also be used to acquire early feedback from the user on whether the design will be acceptable or not before continuing into design development. The simulations are carried out at priority points in the Taman Lansia area. Determination of locations that are used as priority points based on the intensity of space use observed during field observations. The locations selected as priority points are: (1) the entrance area; (2) The area around the T-Rex statue; (3) the Plaza areas; (4) Elderly Post Area; (5) the Pool and bridge areas; (6) Exit area. Photo match simulations use an actual existing photo as a scene to compare with the design proposed on an identical angle. The steps taken in performing the match photo technique are seen in the table below.

4.4. Design Results

The redesign of Taman Lansia Bandung as a therapeutic garden are accomplished by creating activities and restoratives zones by utilizing the natural elements as key components in design principles. The underutilized river area is develop into an active promenade which strengthen the valley-like topography of the park. The connectivity to, from, and through the park is improved by the provision of public transport shelter, bike lane, pedestrian bridge, and sidewalk improvement with universal design.


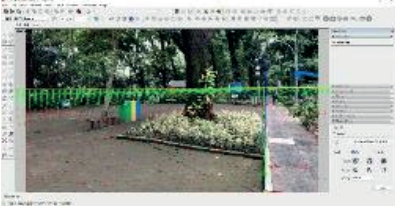
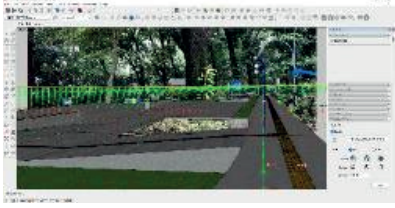
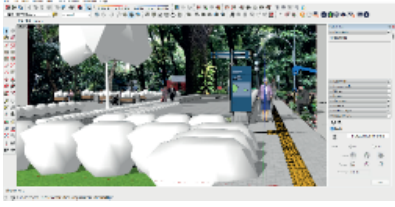

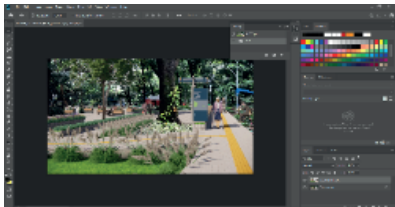
No.	Steps	Illustration
1.	Selecting photos from field observations that have representative angles to display priority locations for import into the 3D model.	
2.	Specifies the perspective line reference and grid size as a guide in creating a 3D model.	
3.	Make a design proposal model based on the design principles that have been formulated with the origin coordinates of the model.	
4.	Adding supporting components for creating the environment.	
5.	Perform rendering to get realistic results using the Enscape software.	
6.	Final editing with Adobe Photoshop software for montage and retouching.	

Figure 10: Steps taken on match photo technique.

Through the match photo technique, a comparison is obtained between the conditions before and after the design. Improvements directed at design proposals are improvement of material quality, application of accessibility standards, provision of supporting infrastructure for elderly mobility, and provision of vegetation that can generate sensory stimuli from the colors, textures, and aromas produced. The comparison

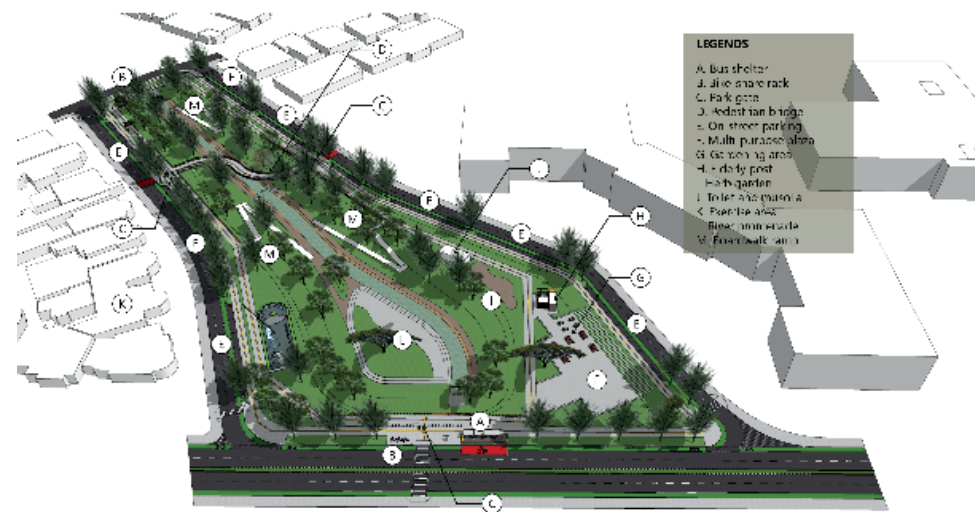


Figure 11: Facilities and amenities of Taman Lansia redesign.

between the existing conditions before the design intervention and the conditions after being designed can be seen in the following figure.

5. Discussion

The design of an elderly garden with the concept of a therapeutic garden produces a design that is more accommodating to the psychological comfort of the elderly such as ease of mobility, safety and security in using facilities, social needs, closeness to nature, and protection from the weather. The existence of an inclusive open space for the elderly is an effort to improve the quality of life of the elderly urban population by providing a space that accommodates an active old age.

The systematic design approach can be further improved by using the latest science and technology. One possibility that can be applied is to combine neuroscience to objectively identify the preferences of specific target groups by recording brain waves that have been given a visual stimulus. Such an approach is very suitable to be applied to subjects that require special attention to cognitive function such as the elderly. Due to limitations in the scope of this research, more analysis is needed before this design is carried out into Detailed Engineering Design and construction. Additional analyses are needed in hydrological and drainage management to make sure of the safety measure in realizing the river as an active water feature area. The accurate mapping and inventory of trees also need to be conducted to minimize the damage to the existing trees. Further



Figure 12: Before and after image of Taman Lansia.

adjustments to the design are to be expected in accordance with the location of the trees.

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