04

THERAPEUTIC LANDSCAPE DESIGN FOR SOCIAL REPAIR: REVITALIZING THE SUNGAI BULOH LEPROSARIUM

Muhammad Qalis Naif Mohd Najib, Putri Haryati Ibrahim*, Zainul Mukrim Baharuddin
Department of Landscape Architecture, Kulliyyah of Architecture and Environmental Design
International Islamic University Malaysia

ABSTRACT

This study repositions the Sungai Buloh Leprosarium into an environment for potential social restoration through the lens of the therapeutic landscape theory, biophilic design principles, and human settlements development history. The research examines how spatial, environmental, and symbolic dimensions of the site may contribute to psychosocial healing and community reintegration. The methodology employed by the study are on-site observation and systematic photographic documentation of the current spatial organisation, environmental condition, architectural heritage, and landscape character of the site. Through qualitative site synthesis, the research establishes the most important narrative layers of environmental and social elements embedded within the settlement. The output from the first phase of the research is a comprehensive site synthesis and articulation of preliminary therapeutic landscape design strategies to transform the leprosarium into a dignified, memorable, and inclusive public engagement space. The first phase of the research presented in the paper will enable the subsequent phase to translate these strategies into a landscape master plan proposal. By framing landscape architecture as a form of social repair, this study contributes to design discourse on how historically stigmatised healthcare sites can be reimagined as resilient, healing environments grounded in human rights and collective memory.

Keywords: Therapeutic Landscape, Social Repair, Leprosarium Heritage
**Corresponding Author: putri@iium.edu.my*

INTRODUCTION

Leprosy, or Hansen's disease, continues to be a global health issue despite being declared eradicated as a public health threat in 2000. Approximately 250,000 new cases are diagnosed every year, primarily in developing countries (World Health Organisation, 2021b, 2025). With the advent of multi-drug therapy (MDT), leprosy can now be cured (Huang et al., 2024). However, many who have been affected by the disease will suffer from long-term stigma, disability, and social exclusion. Historically, public health policy related to leprosy emphasised segregation through forced isolation. These sites became symbolic of fear and separation (Wang & Kim, 2024). The Sungai Buloh Leprosarium in Malaysia, shown in Figure 1, exemplifies these practices in its design. While the initial planning for the site included more humane design approaches and settlement principles similar to those of villages (Koh, 2022), it was still viewed as a place of exclusion. The site is now recognised for its cultural significance and has even been listed as a Tentative World Heritage Site by UNESCO (UNESCO World Heritage Centre, 2019). However, it is still socially influenced by its past. Global strategies currently address not only stopping the spread of leprosy, but also eliminating stigma and discrimination (WHO, 2021a). Despite efforts to reduce stigma, a major challenge remains in the recovery process, which affects mental wellness, delays diagnosis, and prevents social reintegration (Prakoeswa et al., 2020; Wang & Kim, 2024). It requires social and spatial changes. By redefining the leprosarium as a therapeutic landscape rather than an exclusionary one, this research demonstrates how landscape architecture can help reduce historical stigma and support more inclusive, resilient communities.

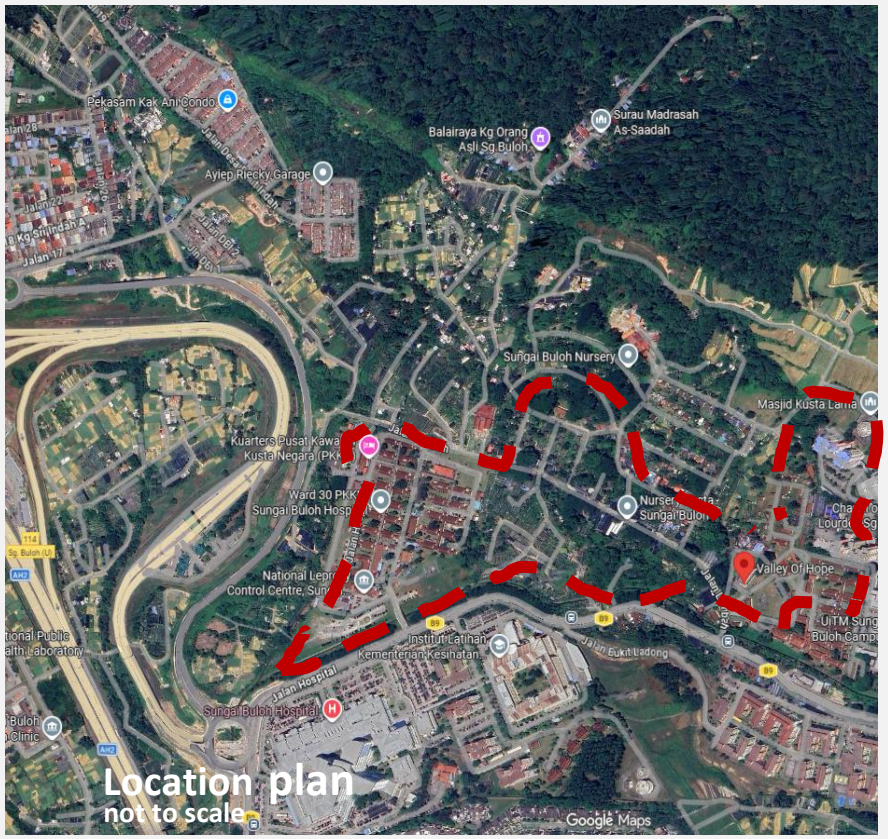

Figure 1: Location of Sungai Buloh Leprosarium at Bukit Lagong, Sungai Buloh, Selangor.

LITERATURE STUDY

HISTORICAL LEGACY OF SUNGAI BULOH LEPROSARIUM

In the early twentieth century, the Sungai Buloh Leprosarium was established (see Figure 2). At that time, it was considered one of the largest leprosy settlement areas in the region. While the Sungai Buloh Leprosarium was intended for isolation at the time of its establishment, the area's design eventually adopted a village-like approach that incorporated environmental and community elements (Koh, 2022). Today, the area is recognised for its cultural heritage values and is included on UNESCO's Tentative World Heritage List (UNESCO World Heritage Centre, 2019). Nonetheless, the Sungai Buloh Leprosarium remains an institution most well-known for its role in segregation. As there are today modern global initiatives to achieve "zero transmission, zero disability, and zero stigma" (WHO, 2019), this represents a movement away from segregation and toward rehabilitation, inclusion, and human rights. Stigma remains, however, very entrenched and affects the quality of life of individuals impacted by leprosy (Prakoeswa et al., 2020).

LEPROSY AS AN ONGOING PUBLIC HEALTH SOCIAL CHALLENGE

Although leprosy is curable with multidrug therapy (MDT), new cases continue to be reported annually (WHO, 2019, 2025). The disease primarily affects the skin and peripheral nerves, and delayed diagnosis can lead to permanent disability (Huang et al., 2024). Beyond medical complications, stigma often results in psychological distress, social isolation, and delayed treatment. Environmental conditions also play an important role in disease persistence. Poor housing quality, inadequate ventilation, limited natural lighting, and overcrowding have been linked to higher leprosy incidence (Romadhani & Sulistyorini, 2020; Rizal et al., 2021).

THERAPEUTIC LANDSCAPE THEORY

Therapeutic landscape theory provides a conceptual framework for understanding how environments contribute to the healing process. The term was first used by Gesler (1992), who described where natural, built, social, and symbolic elements work together to support well-being. The therapeutic landscape perspective, rather than viewing environments simply as a backdrop or setting for life's events, sees environments as contributing factors to health outcomes. Studies have demonstrated that the availability of parks, daylight, clean air, and intentional and supportive spatial planning can reduce stress levels and increase overall mental well-being (El Barmelgy, 2013; Guo et al., 2023). More recently, research has highlighted the importance of the sensory experience and embodied experiences of interacting with nature in creating healing environments (Bell et al., 2023; Sillmann et al., 2024). Thus, within the context of Sungai Buloh, therapeutic landscape theory is used to reinterpret the site as a location not just for the preservation of cultural heritage, but also as an environment for promoting psychosocial recovery and integrating those recovering from trauma or illness into communities.

FROM SEGREGATION TO SOCIAL REPAIR

The literature suggests an interest in understanding leprosaria as sites of confinement and social exclusion. However, there is an opportunity to reimagine leprosaria as educational environments, memorials, and spaces of healing and community. Because leprosy has historically been associated with stigma, defined by physical separation from society and symbolic exclusion, the application of landscape principles, combined with new interpretations of the built heritage at the Sungai Buloh Leprosarium, offers the potential to challenge or alter public perceptions of the stigma associated with leprosy.

METHODOLOGY

This study adopts a qualitative, site-based research approach to examine the spatial, environmental and symbolic dimensions of the Sungai Buloh Leprosarium. Data were collected through systematic on-site observation and photographic documentation focusing on landscape condition, architectural heritage, circulation, vegetation, open space, and environmental factors such as ventilation, daylight, and spatial enclosure. The observations were guided by predefined criteria related to therapeutic landscape principles, including sensory experience, accessibility, and environmental comfort. Photographs were used as analytical tools to examine spatial relationships, material properties, and social activity. The collected data were then analysed using thematic interpretation to identify key environmental, historical and social layers of the site. This process resulted in a comprehensive, evidence-based site analysis that informed the development of preliminary therapeutic landscape design strategies.

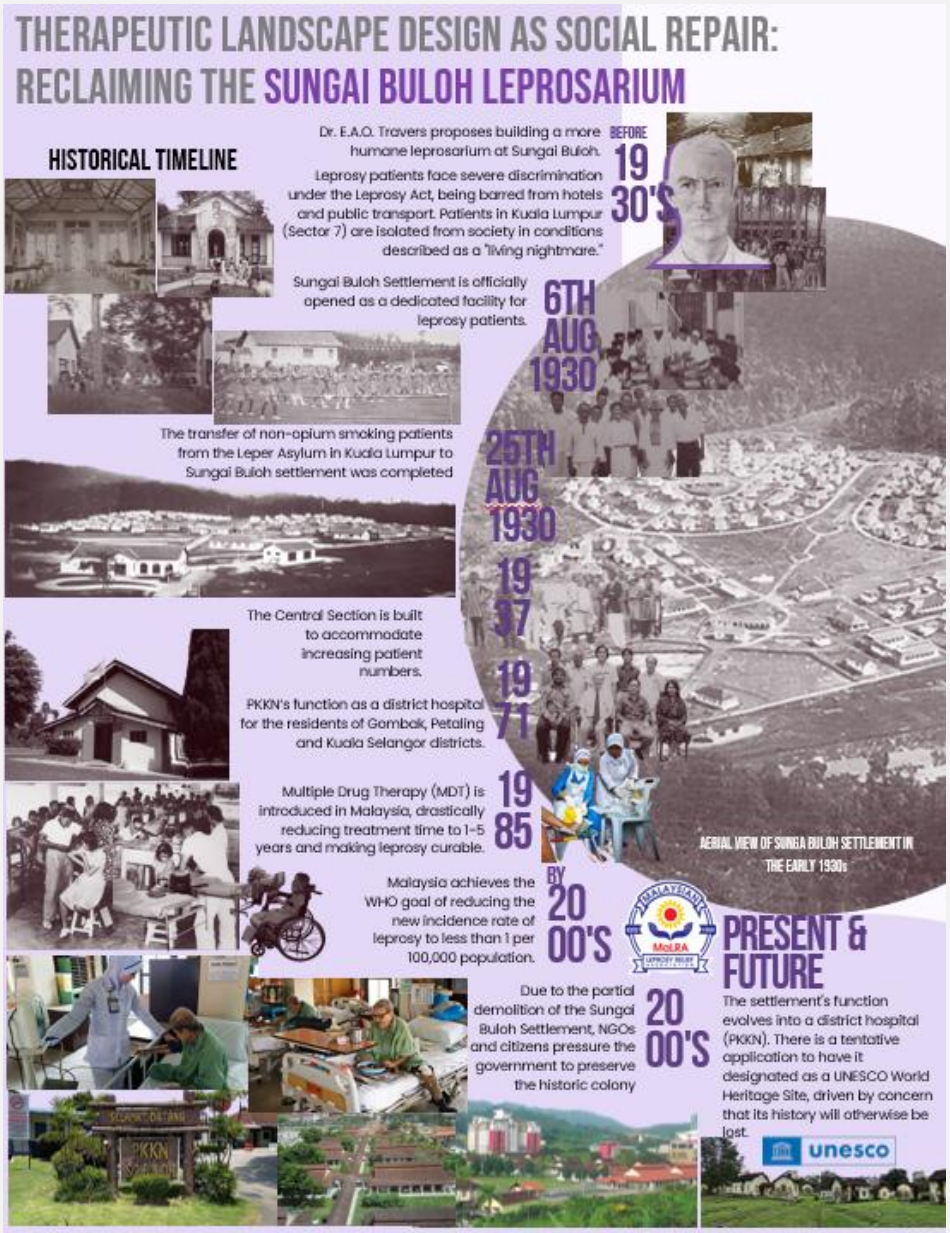

Figure 2: Historical timeline and transformation of the Sungai Buloh Leprosarium.

ANALYSIS OF MICROCLIMATE AND ENVIRONMENTAL FEATURES

Figure 3 shows that the site is strongly influenced by its valley setting, with higher humidity, morning fog, and lower wind speeds. Meteoblue data (2026) indicates average humidity levels of about 85–90%, with morning humidity often above 90%, and temperatures around 32–33°C. Wind speeds are generally low, ranging from 1.0 to 2.5 m/s, due to obstruction by the surrounding valley walls. As a result, the site experiences calmer conditions but higher moisture levels, especially in the low-lying areas. Building designs traditionally used on the site incorporate bioclimatic elements, such as high ceilings, large openings, cross-ventilation, and overhanging rooflines, to enhance indoor temperature regulation and airflow. Sunlight exposure also significantly impacts the site, as it helps achieve sufficient solar penetration and ventilation, thereby lowering moisture content and creating a less favourable environment for bacterial persistence. Mature trees provide shaded areas that offer thermal comfort, and the open lawn allows wind to circulate and sunlight to penetrate. As a result, the site requires a balance of shade, airflow, and sunlight exposure to enhance comfort, reduce humidity, and promote a healthy, therapeutic landscape.

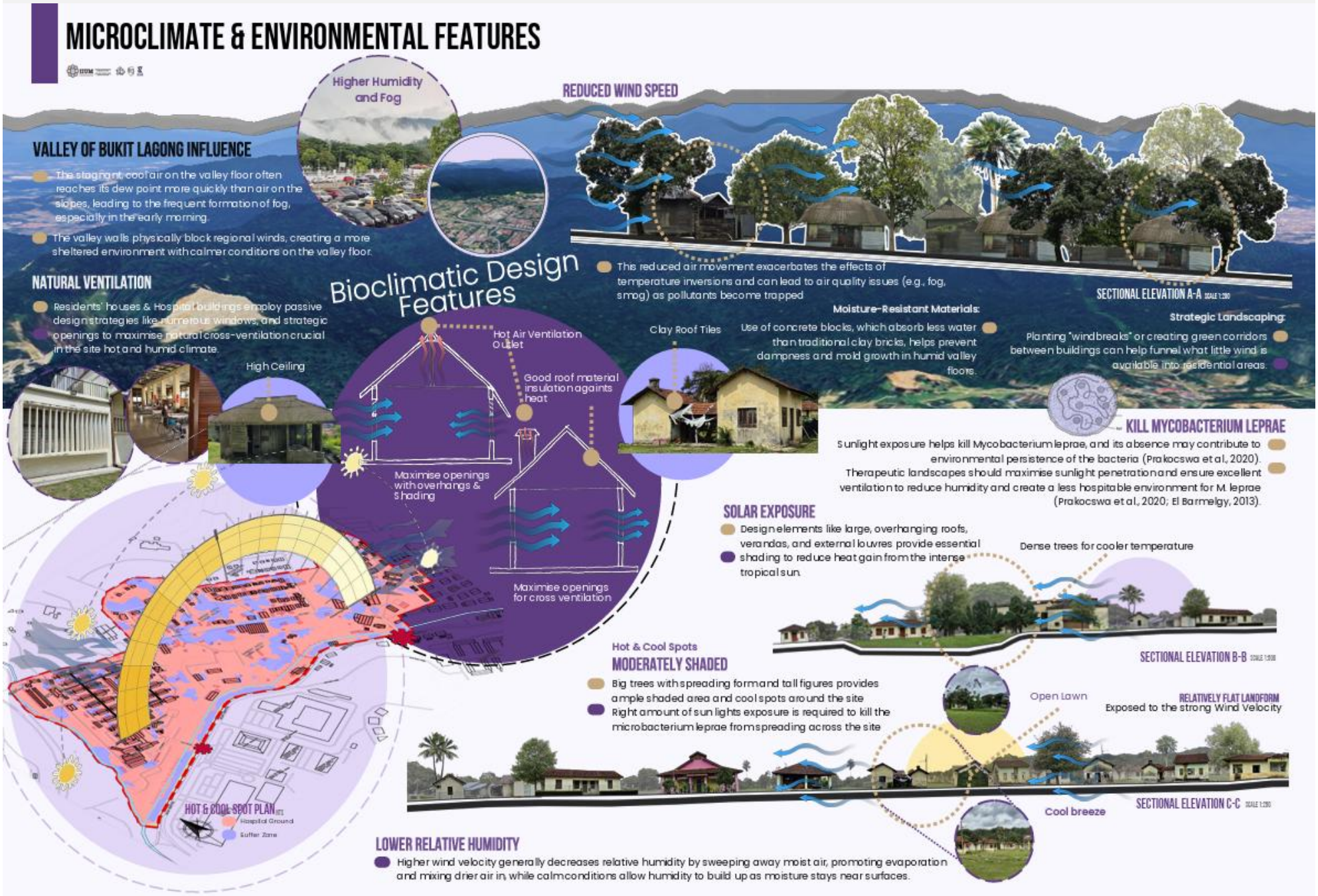

Figure 3: Analysis of microclimate and environmental features of Sungai Buloh Leprosarium.

ANALYSIS OF ACCESSIBILITIES AND CIRCULATION

Figure 4 provides evidence that this site has accessible public transportation and shaded walkways to support pedestrian flow. However, narrow streets, insufficient designated parking, and informal roadside parking frequently limit street width, leading to increased congestion at peak times. The poor maintenance of some of the streets in residential areas, characterised by gravel, broken pavement, or dirt pathways, makes them less safe. The narrow streets on the site help slow traffic due to the site's initial pedestrian-oriented design; however, these characteristics can hinder accessibility for elderly residents and visitors with mobility impairments.

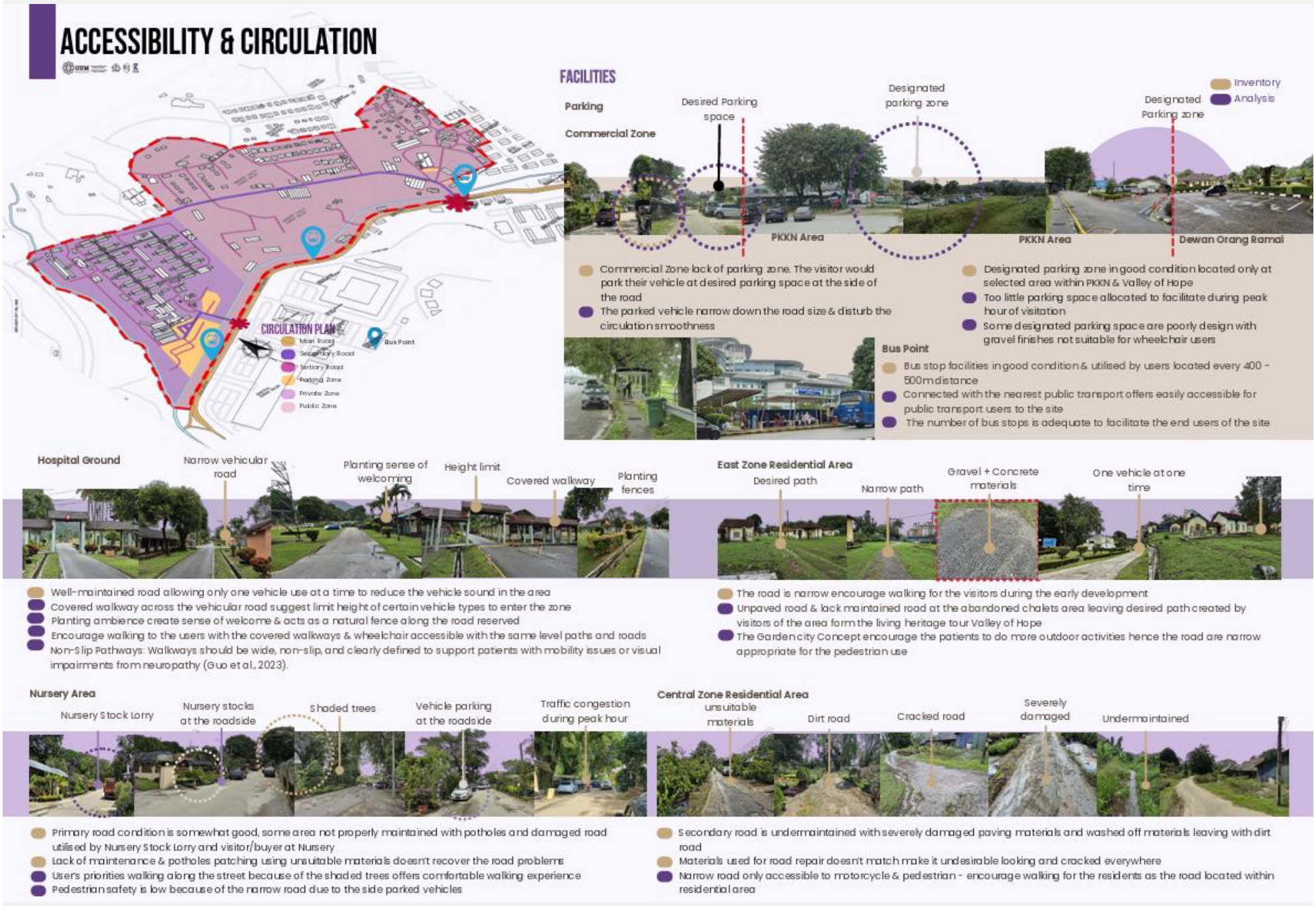

Figure 4: Analysis of accessibility and circulation at Sungai Buloh Leprosarium.

ANALYSIS OF SPACES AND ACTIVITIES

As indicated in Figure 5, the Spaces and Activities Analysis shows that the Sungai Buloh Leprosarium is a multi-layered site that combines health-related services, community care, heritage preservation, and economic development. The site operates today as a treatment and rehabilitation centre while continuing to house elderly former patients, indicating continued health-related services. The site generates income through gardening, operating a nursery, selling flowers, and providing small-scale craft products, supporting the local economy. Guided tours, the *Valley of Hope Story Gallery*, and open museum explorations preserve the site's history and provide educational opportunities, reduce stigma and allow the general public to connect with the site's past. The site hosts community events, raises awareness, and offers recreation programs that promote social interaction among residents, visitors, and researchers.

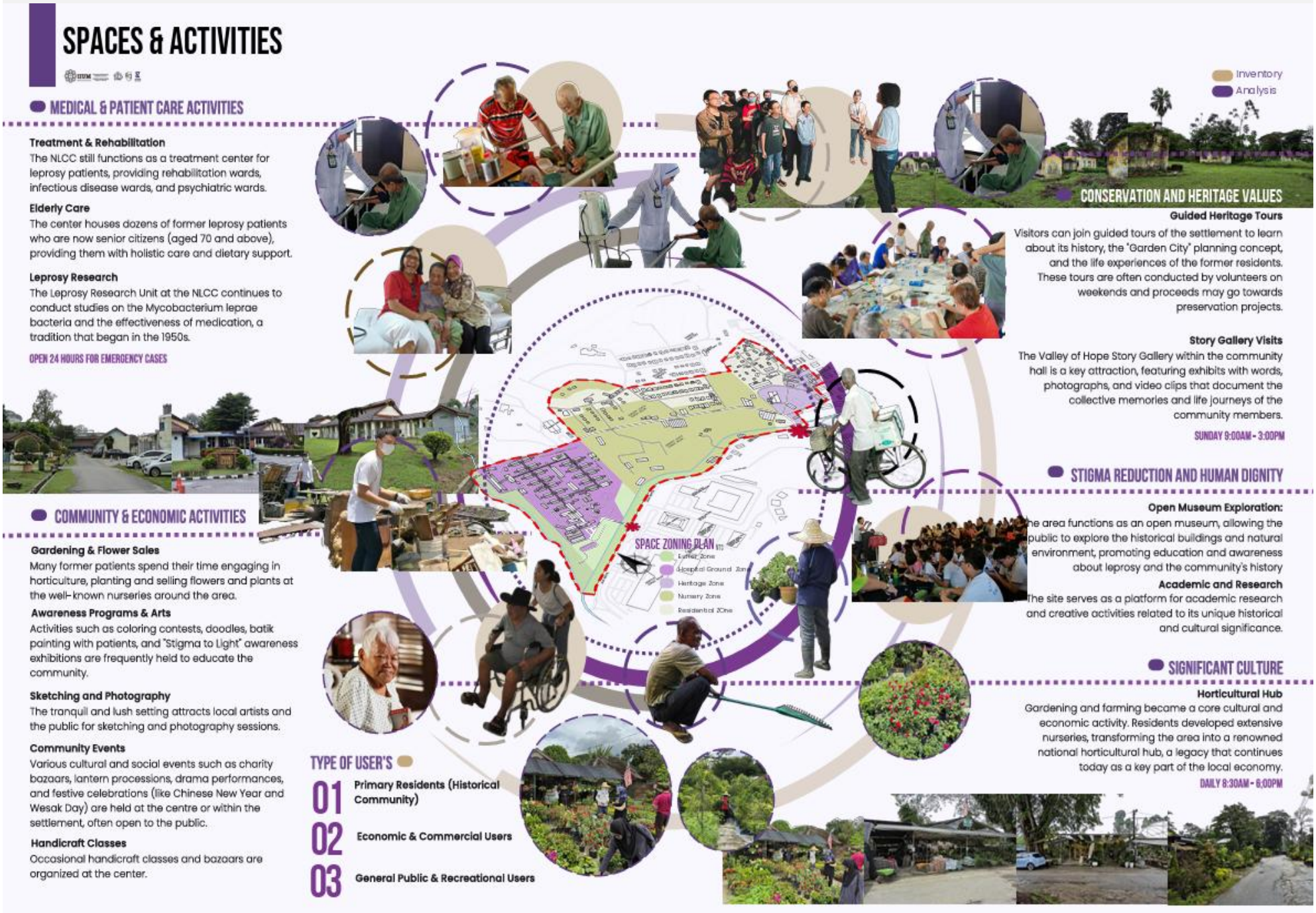

Figure 5: Analysis of spaces and activities at Sungai Buloh Leprosarium

ANALYSIS OF FLORA AND FAUNA

The site, as illustrated in Figure 6, is part of a larger ecological network with the Sungai Buloh River and the Bukit Lagong Forest Reserve functioning as key habitats. The site has a diversity of riparian vegetation, including large canopy trees, fruit trees, and medicinal plants, developed historically through the site's self-sufficient and agroforestry practices. Heritage trees, such as *Hydnocarpus castaneous* (a source of chaulmoogra oil, historically used to treat leprosy), have significant cultural and medical value to the site. The diversity of plant species supports bird life and other small wildlife. A limited riparian buffer zone presents an opportunity to increase blue-green corridor connectivity and enhance biodiversity. Therefore, the site has significant ecological potential to utilise conservation, habitat restoration, and therapeutic planting techniques to improve both its environmental sustainability and heritage identity.

Figure 6: Analysis of flora and fauna at Sungai Buloh Leprosarium

ANALYSIS OF PERCEPTUAL AND IMAGEABILITY STUDY

The Perceptual and Imageability Analysis based on Kevin Lynch's principles indicates that the site has a clear visual structure with recognisable paths, edges, districts, nodes, and landmarks as defined by Lynch (1964). The surrounding hills of Bukit Lagong serve as a natural landmark and borrowed landscape, defining the site's identity and enhancing its psychological refuge. The original Garden City plan and vernacular architectural style foster feelings of home, normalcy, and dignity, countering the previous stigma of isolation. However, abandoned and under-maintained buildings negatively affect the site's visual appeal and contribute to reduced overall visual quality and safety. Trees planted throughout the site help hide unsightly views and frame aesthetically pleasing vistas, thereby creating aesthetic and therapeutic benefits. Figure 7 illustrates that the site has high imageability due to its landscape character and heritage identity. To improve legibility, comfort, and public perception, the site will require careful restoration and visual enhancements.

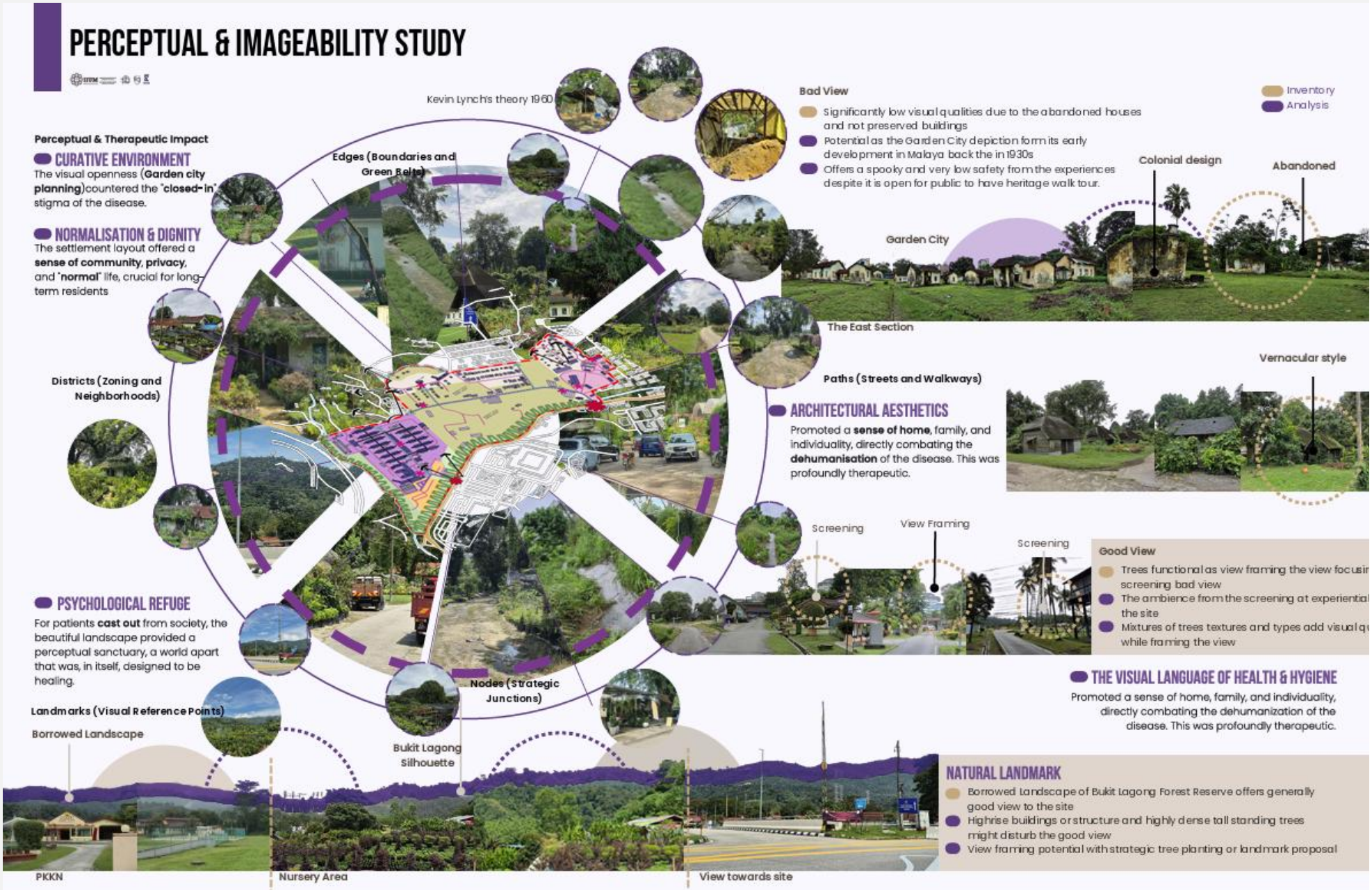

Figure 7: Analysis of perceptual and imageability study at Sungai Buloh Leprosarium

ANALYSIS OF ARCHITECTURAL SIGNIFICANCE AND TANGIBLE HERITAGE

The analysis of the site in Figure 8 shows that the Sungai Buloh Leprosarium has been historically and culturally significant due to the preservation of both colonial and vernacular architectural typologies throughout the site. The site contains various types of buildings, including residential cottages, chalets, administrative buildings, hospital wards, community halls, and public facilities, all part of a self-sufficient model that supports residents and provides a more humane way of living, rather than one based on institutional incarceration. Although many of the structures still contain their original materials (clay tile roofs, weatherboarded timbers, brick and concrete) and have climate-responsive features (high ceilings, large window openings, deep roof overhangs), some of the buildings are in disrepair and need to be preserved in order to support both contemporary uses and the architectural integrity of the buildings. The analysis shows that the tangible heritage of the site goes beyond the value of the architecture itself to represent a social aspect of the site, which is rare in the world: a planned medical community settlement that supports health care, community, quality of life, and environmental sustainability.

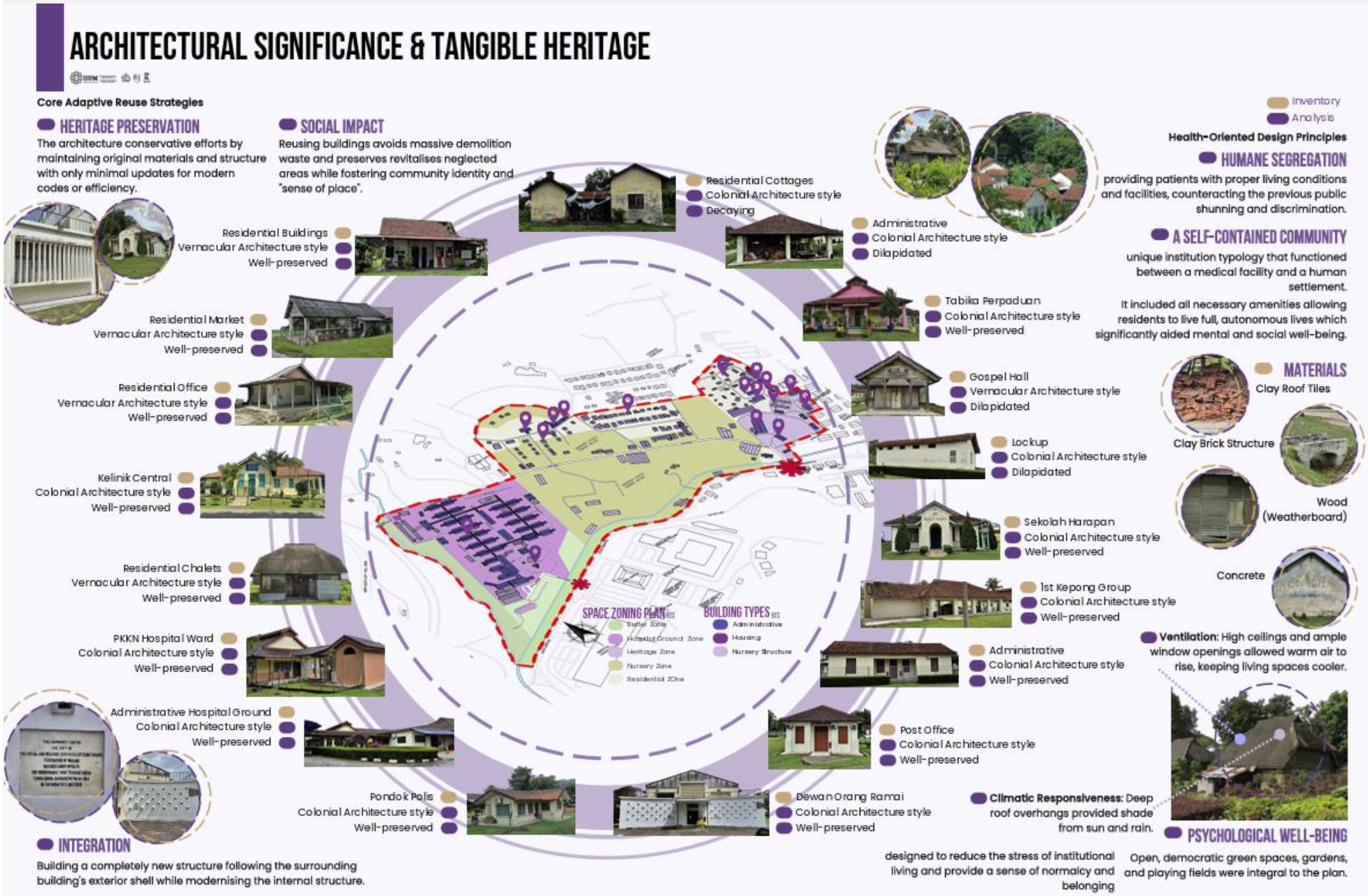

Figure 8: Analysis of architectural significance and tangible heritage at Sungai Buloh Leprosarium

SITE SYNTHESIS

Figure 9 displays the integration of the environmental, historical and social aspects of the site to reposition the Sungai Buloh Leprosarium as a therapeutic landscape that incorporates restoration and adaptive reuse by improving the river corridors, creating better pedestrian connectivity and creating additional programmatic areas (rehabilitation gardens, ethnobotany and others) that will allow the existing physical structure of the site to be transformed from an exclusive space for healing and recovery to a space where everyone can heal and recover together.

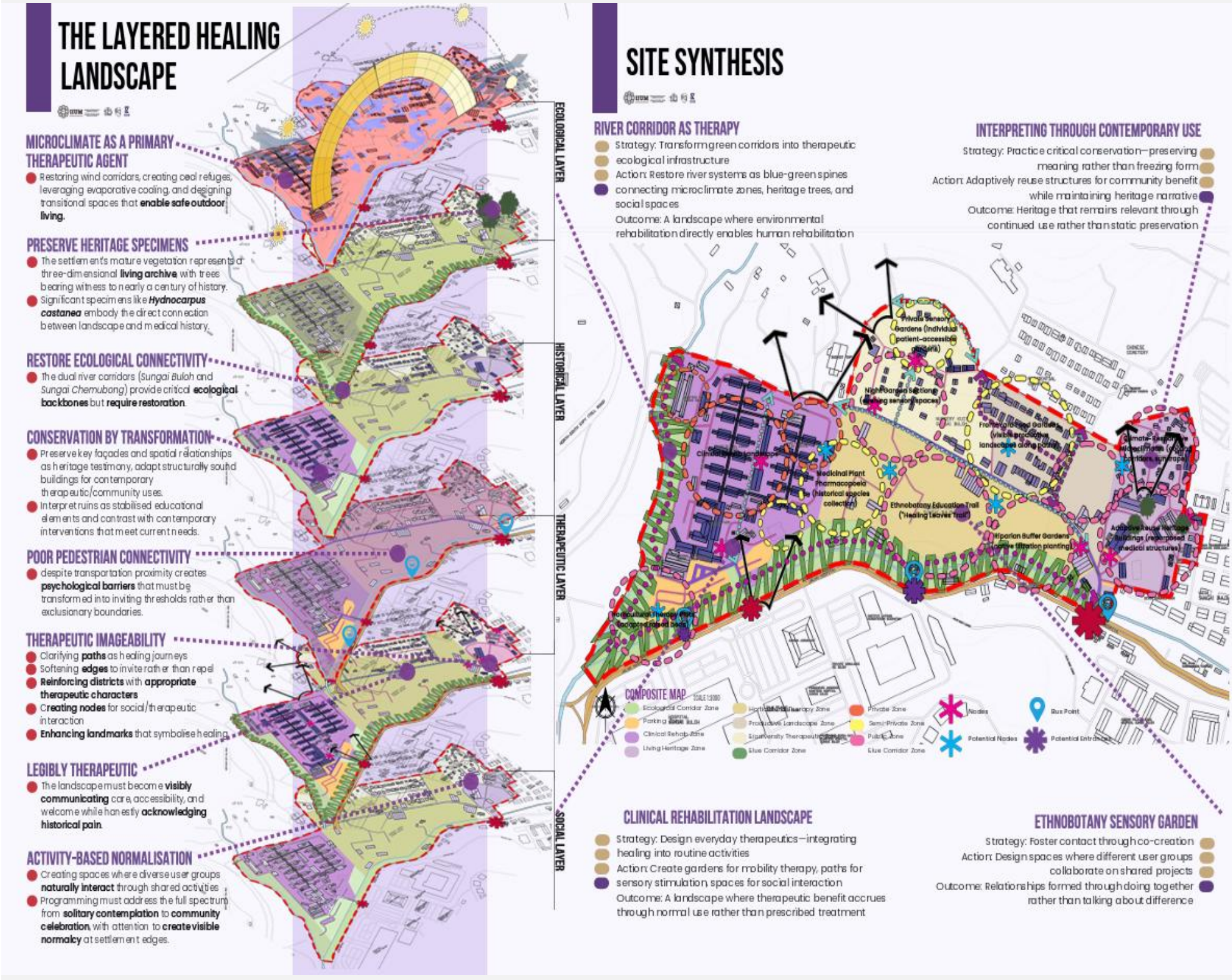

Figure 9: Site synthesis of Sungai Buloh Leprosarium

DESIGN STRATEGIES

The design strategy displayed in Figure 10 organised the site into thematic areas that integrated ecological restoration, clinical rehabilitation, ethnobotany, heritage conservation and social empowerment into a single framework for a unified approach to therapy. Through the re-establishment of river corridors, the activation of productive landscapes, the adaptation of existing historic buildings, and the placement of everyday healing spaces within the site, the proposal transforms the former leper colony into a living landscape of health, dignity, and community belonging.

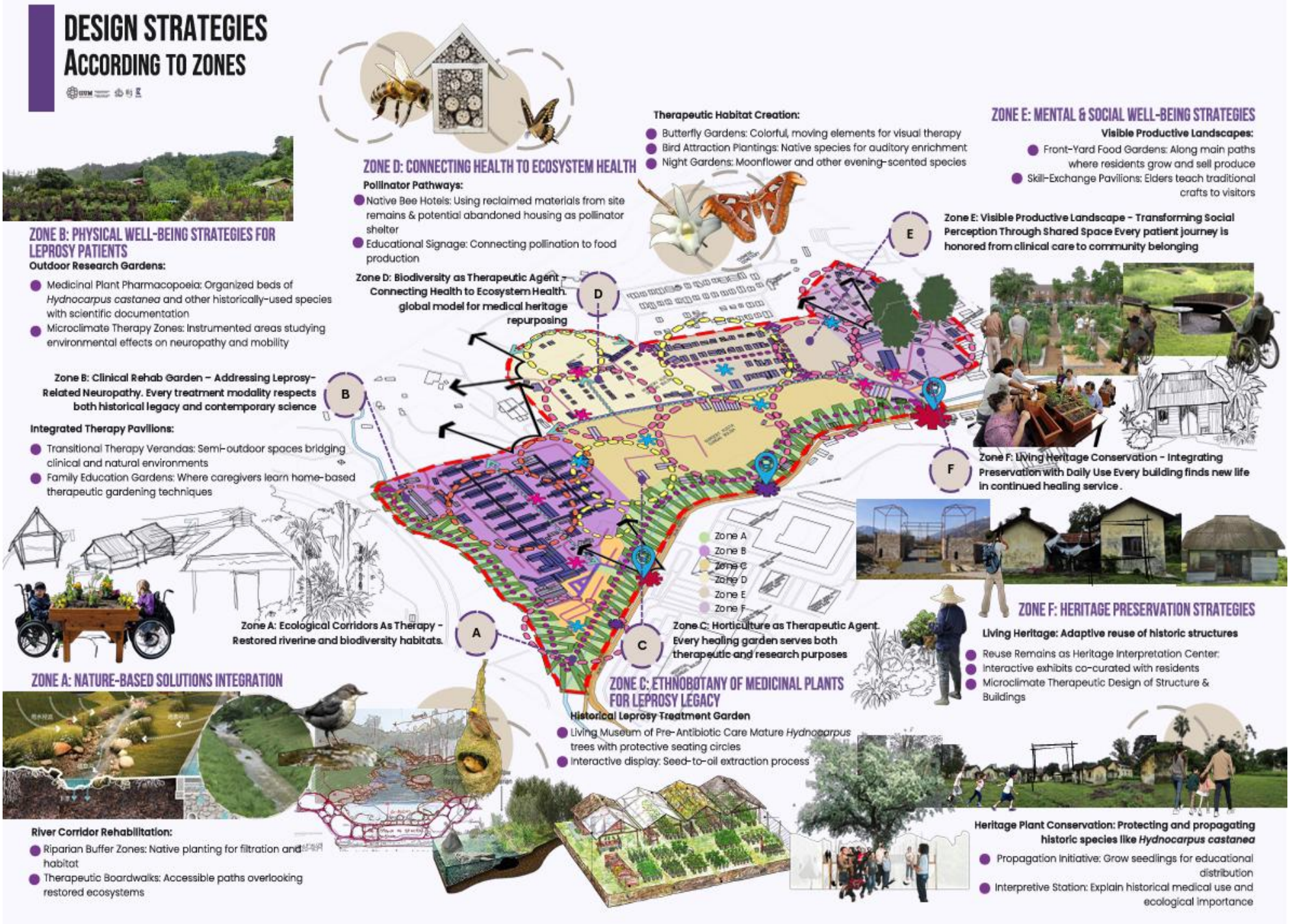

Figure 10: Design strategies according to zones for Sungai Buloh Leprosarium

CONCLUSION

The study repositions the Sungai Buloh Leprosarium from a historical site of segregation to a potential landscape of social repair. While biomedical advances have proven that leprosy is curable, the spatial and symbolic legacy of isolation continues to shape public perception and lived experience. Through site-based observation and photographic analysis, this research reveals that the settlement retains strong ecological structure, heritage architecture, productive landscapes, and therapeutic spatial qualities that can be strategically enhanced rather than erased.

The synthesis demonstrates that healing elements at Sungai Buloh operate across multiple layers, including microclimate biodiversity, architecture, heritage, and everyday social activity. River corridors, mature trees, vernacular buildings, and horticultural traditions collectively form a foundation for a therapeutic landscape that integrates environmental restoration with psychosocial rehabilitation. However, issues such as poor pedestrian connectivity, underutilised heritage structures, visual deterioration, and ecological fragmentation require targeted design intervention.

By framing landscape architecture as an instrument of social repair, this study argues that transformation need not entail demolition or erasure, but rather careful reinterpretation and adaptive reuse. The first phase establishes a strategic framework that reconnects ecological systems, restores dignity through spatial design and activates heritage through contemporary use. From this phase, the subsequent phase will translate this synthesis into a comprehensive landscape master plan.

REFERENCES

Bell, S. L., Hickman, C., & Houghon, F. (2023). From therapeutic landscape to therapeutic 'sensescape': Experience with nature? A scoping review. *Wellbeing, Space and Society*, 4, 100126. https://doi.org/10.1016/j.was.2022.100126

El Barmelgy, H. (2013). Healing gardens' design: Offering a practical framework for designing private healing gardens. *International Journal of Education and Research*, 1(6), 1-20

Gesler, W. M. (1992). Therapeutic landscapes: Medical issues in light of the new cultural geography. *Social Sciences & Medicine*, 34(7), 735-746. https://doi.org/10.1016/0277-9536(92)90360-3

Guo, H., Zhaou, W., Lai, W., & Yao, L. (2023). What landscape elements are needed for hospital healing spaces? Evidence from empirical study of 10 compact hospitals. Frontiers in Public Health, 11, https://www.frontiersin.org/journals/publichealth/articles/10.3389/fpubh.2023.1243582/full

Huang, C. Y., Su, S. B., & Chen, K. T. (2024). An update of the diagnosis, treatment, and prevention of leprosy: *A narrative review. Medicine*, 103(34), e39006. https://journals.lww.com/md-journal/fulltext/2024/08230/an_update_of_the_diagnosis,_treatment,_and.21.aspx

Hao, K. J. A (2022). Phenomenological study of the Sungai Buloh Leprosarium heritage dwelling. *Journal of Engineering Science and Technology*, Special Issue on STAAUH, November (2022) 46 – 59

Lynch, K. (1964). The image of the city. MIT press.

Meteoblue. (2026). Weather history and climate data for Sungai Buloh, Malaysia. https://www.mwtwoblue.com

Prakoeswa, F. R. S., Ilhami, A. Z., Luthfia, R., Putri, A. S., Soebono, H., Husada, D., ... & Prakoeswa, C. R. S. (2020). Correlation analysis between household hygiene and sanitation and nutritional status and female leprosy in Gresik Regency. *Dermatology Research and Practice*, 2020(1), 4379825.

Romdhani, F., & Sulistyorini, L. (2020). Kejadian Kasus Kusta Di Wilayah Kerja Pukesmas Talango Kabupaten Sumenep: Studi Kasus Kontrol. *Jurnal Kesehatan Lingkungan*, 12(1), 2020-21.

Sillmann, T. A., Marques, P. O., & Mattiuz, C. F. M. (2024). Therapeutic gardens: historical context, foundations, and landscaping. *Ornamental Horticulture*, 30, e242740. https://www.scielo.br/j/oh/a/Ncg6GVFSNXJB8JXMdXjyjrt/?lang=en

UNESCO World Heritage Centre. (2019) UNESCO's Tentative World Heritage list. https://whc.unesco.org/en/tentativelists/

Wang, S. Y., & Kim, J. (2024). Lens to difficult history: Museums of Hansen's disease in Malaysia, South Korea, and Taiwan. *Memory Studies*, 17(1), 86-102. https://journals.sagepub.com/doi/10.1177/17506980231215011

World Health Organisation. (2021a, September 3). Global leprosy (Hansen disease) update, 2019: time to step up prevention initiatives. https://www.who.int/publications/i/item/who-wer9536

World Health Organisation. (2021b, April 15). Towards zero leprosy. Global leprosy (Hansen's Disease) strategy 2021–2030. https://www.who.int/publications/i/item/9789290228509

World Health Organisation. (2025, January 2026). World Leprosy (Hansen's Disease) Day. https://www.paho.org/en/campaigns/world-leprosy-hansens-disease-day